AXILLARY LYMPH-NODES IN PATIENTS WITHOUT BREAST CARCINOMA

T. J. McNAIR
M.B. Edin., F.R.C.S.E., F.R.C.S.
LECTURER IN SURGERY, UNIVERSITY OF EDINBURGH

H. A. F. DUDLEY *
Ch.M. Edin., F.R.C.S.E.
FORMERLY LECTURER IN SURGERY, UNIVERSITY OF EDINBURGH

From the Department of Clinical Surgery, University of Edinburgh

EXAMINATION of the axillary lymph-nodes is an important part of the investigation of patients with carcinoma of the breast, and the presence or absence of axillary lymph-nodes, and their mobility or fixation, are very often the features which determine the staging of the individual case. Thus in the Manchester system of staging (1946), patients without palpable nodes are staged I, patients with palpable, but mobile, nodes are staged II, and patients with palpable and fixed nodes are staged IV. In the more recent classification proposed by the research commission of the International Union against Cancer (1958) the same three groups would be stages I, II, and III respectively. These widely different stages are associated with differing 5-year survival-rates; in some centres the stage into which the patient is placed will largely determine the type and extent of the surgical or radiotherapeutic measures to be employed.

TABLE I—AGE-DISTRIBUTION OF SERIES

Age	Under 20	20–29	30–39	40–49	50–59	60–69	70 plus
No. of patients	4	5	6	8	10	10	19

TABLE II—FINDING OF NODES

—	Observer A	Observer B
Total patients with palpable nodes	34	31
Nodes in both axillæ	11	9
Nodes in left axilla	5	5
Nodes in right axilla	18	17
No nodes	28	31

TABLE III—AVERAGE NODE-FINDING AND OBSERVER DIFFERENCE

—	Observer A	Observer B
Total patients with palpable axillary nodes	34 (55%)	31 (50%)
Observer difference	(average 53%) 34 axillæ in 124 (27%)	

Considering the importance attached to clinical staging, little attention has been paid to the clinical pattern of axillary lymph-nodes in "normal" women, and our ignorance about this pattern is surprising. Furthermore, the accuracy and the constancy of any single clinician's examination have been too readily accepted in the past. Disagreement between clinicians (whether surgeons or radiotherapists) is frequent. Such arguments and doubts as these prompted the following investigations in an attempt to determine:

1. In what percentage of normal females axillary nodes were palpable.
2. The difference between the findings of any two clinicians in a significant number of patients.
3. How wide was the range between the findings of different examiners.

*Present address: Department of Surgery, University of Aberdeen.

Investigation

The investigation was carried out in two parts.

PART 1

Two observers (A and B) each examined the axillæ of 62 patients who were in hospital for treatment of conditions not related to their breasts or axillæ, and who did not suffer from any clinical lesion of the breast. The findings of each examination were recorded on a standard form and transferred to punch cards. Thus 248 axillary examinations were recorded in a group of apparently normal subjects.

TABLE IV—OBSERVER DIFFERENCE AND BUILD OF PATIENT

Build	Difference	No difference
Slim	16	5
Normal	12	14
Obese	6	9

The age-distribution of these patients (table I) reflects the high average age of patients in a modern general surgical unit.

The number of patients in whom observers A and B found palpable axillary nodes is shown in tables II and III. The finding of nodes is seen to be fairly uniform for the two observers and does not seem to depend on technique. Nodes were, however, apparently more common in the right axilla than in the left, and this may reflect a greater incidence of minor trauma and sepsis on the right side. Observers A and B disagreed on the presence or absence of nodes in 27% of axillæ, but the incidence of disagreement was lowest in obese patients (table IV). This could have been explained by a failure to find any nodes whatever in the obese, but in fact the incidence of positive axillæ in obese patients was for both observers as high as in slim or normally built patients.

The cases in which "negative" findings were recorded were separately analysed (table V). The observers agreed that the axillæ of 19 patients were completely negative. However, observer A recorded as doubly negative (both right and left axillæ negative) only 8 patients whom observer B labelled positive, while observer B labelled doubly negative 15 patients whom observer A regarded as positive. Observer B would therefore be much less likely to put a patient down from stage I to stage II than would observer A. It could be concluded that observer A was capable of better discrimination, or that he was less likely to identify other structures as lymph-nodes than was observer B. Alternatively it could be argued than when in doubt, observer A favoured the positive and observer B favoured the negative.

TABLE V—"NEGATIVE" CASES

Agreed negatives	19
Disagreed negatives:	
Observer A/Observer B	8
Observer B/Observer A	15

Not all the nodes found at this examination would be regarded as undoubtedly carcinomatous, but about one-third were described as firm or hard and one-half were estimated to be 0·5 in. or more in diameter.

PART 2

After analysis of the above results, we decided on a further clinical experiment. Five clinicians (surgeons and

TABLE VI—PATIENTS WITH BREAST PATHOLOGY

Serial no. of patient	Breast lesion
1	Bilateral breast abscess
2	Tumour in left breast immediately behind nipple
3	Large tumour in upper outer quadrant of left breast continuing into tail of breast
4	Left breast previously removed by simple mastectomy with later radiotherapy; known at time of experiment to have skeletal metastases

radiotherapists) agreed to take part. 10 patients were selected and placed in random order. Each patient was masked and the body draped in such a way as to expose only the shoulders and axillæ; the breasts were concealed as far as possible. In 6 of these patients the breasts were normal on clinical examination and there was no reason for expecting the axillary glands to be enlarged. The other 4 had abnormalities of the breast or breasts as listed in table VI.

After the 10 patients had been placed in random order the five clinicians were invited to examine them independently.

The patients were examined by whatever method each examiner favoured: one examiner preferred the patients to lie down, the others all performed their examinations with the patients seated, although their technique varied greatly. The findings of each examiner were recorded on a standard form and transferred to punch cards.

Thus, 100 axillary examinations (10 patients, 20 axillæ, five examiners) were available for study. Of the 20 individual axillæ, 5 were "abnormal" (4 left and 1 right) and 15 were "normal".

Examination of patients without breast pathology.—Positive findings were recorded by the examiners in 48% of these examinations. Considerable differences were noted between the five examiners and the range was such

TABLE VII—FIVE CLINICIANS: SUMMARY OF RESULTS

—	Patients without breast pathology	Patients with breast pathology
Positive findings by 5 examiners ..	48%	48%
Disagreement between examiners ..	40%	35%

that while one examiner recorded only 20% of all these axillæ positive, another recorded no less than 73% positive.

Examination of patients with breast pathology.—There were 4 "abnormal" left axillæ and 1 "abnormal" right axilla. Positive findings were again recorded in 48% of these examinations. Once more, considerable differences were noted between examiners and the range of positive finding varied from 20 to 80%.

Disagreement between examiners.—For each individual axilla, 5 examinations were recorded. There were thus 10 possible comparisons for each axilla. Forty per cent of "normal" axillæ were disputed and 35% of the "abnormal" axillæ were disputed (table VII).

It is of interest to note that patient 2 in table VI was variously placed in stages I to stage IV (Manchester staging) by different examiners.

OVERALL TOTAL OF POSITIVE AXILLÆ

Combining the results obtained from both parts of the investigation in respect of the "normal" axillæ only, it was found that out of 308 examinations, 114 were positive for nodes—an overall rate of 37% in "normals".

Discussion

Part 2 of the investigation tends to support—and indeed magnifies—the findings of the two examiners in part 1.

The outstanding facts which emerge from this trial are:

(a) 37% of "normal" female axillæ had palpable axillary lymph-nodes. Thus, it is probable that about one-third of patients who develop a carcinoma in the breast may be placed in stage II for reasons in no way associated with their tumour or its dissemination.

(b) In some 35–40% of cases clinicians differ on the presence or absence of nodes.

The high observer difference must raise grave doubts about the value of the present use of lymph-nodes as a means of staging. If such difference occurs over the very presence of nodes, how much more likely is it that disagreement will exist over such characteristics as their degree of fixation or their consistence not only in the axilla but also elsewhere?

Since it was our finding that 37% of axillæ had a palpable enlarged node even before carcinoma of the breast develops, it may be deduced that about one-third of carcinomatous patients will be wrongly placed in stage II when they rightly belong in stage I. The bearing of these findings on the published results of treatment of breast cancer are of great interest. As an example, we abstracted the figures of one series (McWhirter 1955). If it be allowed that of every 100 patients with "early" carcinoma of the breast approximately 54 are usually placed in stage I and 46 in stage II, and that in the same series the five-year cure rate in stage I is 71% and in stage II is 56%, then it can be calculated that stage II properly contains only 14 patients and that only 3 survive to five years when corrections are applied for the initial 37% error in staging. For the same series, this alters the stage II cure-rate at five years from 56% to 21%. This corrected cure-rate (21%) at five years when axillary lymph-nodes are involved, surely leaves much to be desired and much to be achieved in the treatment of early carcinoma. These figures make it seem unlikely that clinical classification of breast cancer by examination of the axillary lymph-nodes has any part to play in the management of the disease.

It is not the purpose of this paper to criticise any individual method of treatment, but rather to call attention to anomalies in the criteria upon which the results of treatment may be assessed. The numerical stages into which a disease is subdivided should represent the progress of the disease process. Therefore, the criteria upon which stages are decided must themselves be concerned with the disease and not with chance circumstances. When chance occurrence enters the staging procedure, the stages become not only valueless but also misleading. In a broader view, the results also demonstrate two truths insufficiently realised in surgical practice: first, that self-evident clinical premises require periodic re-examination; and secondly, that gross differences in clinical observation between examiners are commonplace.

Summary

A study of the incidence of palpable axillary lymph-nodes in normal females is described: palpable nodes were found in 37% of female axillæ, without evident causative disease.

In 35–40% of patients differences of opinion were found between examiners.

The bearing of these findings on the clinical staging of carcinoma of the breast is discussed: the use of axillary lymph-nodes for this purpose is seen to be valueless and misleading.

References at foot of next column

HYPERBILIRUBINÆMIA IN PREMATURE INFANTS AND THE EFFECT OF SYNTHETIC VITAMIN K

BERYL CORNER
M.D. Lond., F.R.C.P.
SHAW LECTURER IN DISEASES OF CHILDREN AND CLINICAL TEACHER IN CHILD HEALTH, UNIVERSITY OF BRISTOL

ELIZABETH BERRY
M.B. Brist.
RESEARCH ASSISTANT IN PÆDIATRICS, SOUTHMEAD GENERAL HOSPITAL, BRISTOL

A. V. NEALE
M.D. Birm., F.R.C.P., D.P.H.
PROFESSOR OF CHILD HEALTH, UNIVERSITY OF BRISTOL

HYPERBILIRUBINÆMIA and kernicterus are sometimes seen in premature infants who show no evidence of isoimmunisation; but the recorded incidence varies considerably throughout the world. During 1948–54 kernicterus without evidence of hæmolytic disease was found post mortem in 67 from a total of 2599 premature infants nursed in the two units in Bristol—an incidence of 2·6%. Crosse et al. (1955) reported the incidence of kernicterus as 2·3% of all admissions to their premature-infant units in Birmingham, the highest figure being 4·1% in one unit. Through the courtesy of Dr. Clement Smith and Dr. Stewart Clifford, a survey was made of all postmortem reports on infants in the Boston Lying-in Hospital during 1948–54. 483 necropsies were performed, 26 of them in infants who died after three days, but only 3 cases of kernicterus without isoimmunisation could be found in the whole series. This contrasts with the experience in Britain during the same period.

A study of serum-bilirubin levels in premature infants without evidence of isoimmunisation was started in July, 1954, among babies admitted to the two Bristol premature-baby units. At the end of 1954 we noticed that kernicterus had in fact neither been suspected clinically nor demonstrated post mortem in any of the premature infants who had died during the previous twelve months; this contrasted strikingly with the experience of the previous seven years.

Shortly afterwards reports began to appear of the possible association of large doses of the synthetic vitamin-K analogue, tetrasodium 2-methylnaphthalene-1:4-diol phosphate, known as 'Synkavit' or 'Kappadione' (Allison 1955, Crosse et al. 1955, Laurance 1955). Later close correlation between the intramuscular dosage of this drug and the level of serum-bilirubin was demonstrated by several workers (Bound and Telfer 1956, Meyer and Angus 1956, Ströder et al. 1957).

Inquiry into the use of synthetic vitamin-K analogues in our two units revealed that until December, 1953, synkavit had been given routinely to all babies admitted, as three intramuscular injections of 10 mg. during the first twenty-four hours, followed by oral treatment with 10 mg. t.d.s. for the next three days. If the infant's condition was too poor to allow of oral feeding, two or even three further intramuscular injections were given during the second twenty-four hours. Thus all infants were given 30 mg. and some had as much as 60 mg. by intramuscular injection in the first forty-eight hours of life.

MR. MCNAIR, MR. DUDLEY : REFERENCES

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Unknown to us, in January, 1954, synkavit had been replaced by a different vitamin-K analogue known as 'Vikastab' (menaphthone dipotassium sulphate), given in the same dosage as synkavit. Because the experimental work of Allison et al. (1956) suggested that other synthetic vitamin-K analogues might be less toxic than synkavit, we decided to study the effect of vikastab in different doses on the serum-bilirubin level.

The Investigation

The babies studied were all nursed in the premature units of two Bristol maternity hospitals between July, 1954, and December, 1956.

All weighed 5 lb. 8 oz. or less, and the routine care (including indications for giving oxygen and antibiotics) were the same in the two units. Maternal analgesia and obstetric techniques were also comparable.

All babies were included except those who showed evidence of Rh, ABO, or other blood-group incompatibility; those in whom technical difficulties prevented the collection of blood samples; and those who died during the first forty-eight hours.

The slightly modified method of Evelyn and Malloy was used for serum-bilirubin estimations, which were all made on venous blood usually taken from the median basilic vein, and which were performed in the laboratory of Southmead General Hospital. Whenever possible the first estimation was made on umbilical-cord blood.

Because the work of Hsia et al. (1953) suggested that the highest level of bilirubin was likely to be reached on the fourth day, during the first year samples were taken on the second and fourth days. Billing et al. (1954), however, showed that the time of the peak level of bilirubin depended on maturity; therefore from Aug. 1, 1955, the maximum serum-bilirubin level was determined by daily estimations which were continued until the level dropped significantly.

Thus, during the first year of the investigation serum-bilirubin levels were estimated until the fourth day on babies who were given 30–60 mg. of vikastab by intramuscular injection in the first forty-eight hours. Later, on admission to the premature nursery, the infants were allotted consecutively to one of three treatment regimes:

1. No synthetic vitamin-K analogue was given.
2. Vikastab 5 mg. was given as a single intramuscular dose within an hour of birth.
3. Vikastab 5 mg. was given intramuscularly 2–3 times at twelve-hourly intervals.

Results

436 cases were available for final assessment of results. These were divided into four groups according to vitamin-K dosage:

1.	No vitamin K	107 infants
2.	Vikastab 5 mg.	94 „
3.	„ 10–15 mg.	138 „
4.	„ 30–60 mg.	97 „

For purposes of analysis the infants were also divided into groups according to gestational age, which was estimated in the usual way by calculation from the mother's last menstrual period. In a few cases the clinical assessment of the infant, and particularly the development of sucking and swallowing reflexes, was also taken into consideration in allotting the case to a maturity group. Relation of serum-bilirubin level to estimated maturity rather than to birth-weight was thought to be more accurate because some twins were included in this survey, and their birth-weights are usually lower than singletons of the same maturity. When the analyses were made, however, there were no significant differences between comparison of serum-bilirubin levels with either estimated maturity or birth-weight.

Table I shows the mean values for maximum serum-bilirubin levels in each maturity group for each treat-

TABLE I—RELATION OF MAXIMUM SERUM-BILIRUBIN TO MATURITY AND VITAMIN-K DOSAGE

Serum-bilirubin (mg. per 100 ml.)	No. of infants															
	29–32 wks. Vitamin K (mg.)				33–36 wks. Vitamin K (mg.)				37–40 wks. Vitamin K (mg.)				Over 40 wks. Vitamin K (mg.)			
	0	5	10–15	20+	0	5	10–15	20+	0	5	10–15	20+	0	5	10–15	20+
>25	2	4	1	2	10	2	6	5	..	..	1	1	..	..	..	..
21–25	5	..	2	1	9	2	6	12	3	3	3	2	1	..	..	..
16–20	3	..	..	3	16	5	5	9	4	1	2	2	1	..	..	..
11–15	2	..	4	3	10	14	6	18	3	4	5	10	2	2	..	..
6–10	..	..	..	..	14	4	4	10	7	9	9	6	1	..	..	1
<5	1	..	..	..	5	3	2	3	5	6	4	3	1	..	..	..
Total no. of babies	13	4	7	9	64	30	29	57	22	23	24	24	6	2	..	1
	33				180				93				9			

Vitamin K = Dipotassium menaphthone bisulphate (' Vikastab ').

TABLE II—RELATION OF FOURTH-DAY SERUM-BILIRUBIN TO MATURITY AND VITAMIN-K DOSAGE

Fourth-day bilirubin (mg. per 100 ml.)	No. of infants															
	29–32 wks. Vitamin K (mg.)				33–36 wks. Vitamin K (mg.)				37–40 wks. Vitamin K (mg.)				Over 40 wks. Vitamin K (mg.)			
	0	5	10–15	30+	0	5	10–15	30+	0	5	10–15	30+	0	5	10–15	30+
<5	1	0	0	0	6	5	5	7	5	11	11	5	1	0	0	0
6–10	1	0	2	0	13	6	13	7	6	11	12	8	2	1	0	1
11–15	2	3	8	3	13	9	18	23	4	8	4	7	0	1	0	0
16–20	4	2	7	3	15	8	20	8	3	2	3	2	1	0	0	0
20–25	2	3	5	1	5	4	8	9	2	3	2	1	0	0	0	0
>25	..	1	0	1	3	0	2	3	0	0	1	0	0	0	0	0
Total no. of babies	10	9	22	8	55	32	66	57	20	35	33	23	4	2	0	1
	49				210				111				7			

Vitamin K = Dipotassium menaphthone bisulphate.

ment regime in 315 cases. The most obvious finding is the relation between maximum serum-bilirubin level and maturity, which confirms the work of Billing et al. (1954). No significant difference was found in the serum-bilirubin levels in each maturity group between those babies who had no vikastab and those who had either of the selected dosage scales. Fig. 1 shows that the slope of the regression lines is the same in all cases.

The figures for the 377 infants in whom fourth-day serum-bilirubin levels were estimated were also analysed similarly (table II); again no statistical difference emerges between the fourth-day serum-bilirubin levels in each maturity group for any of the four different regimes, and, as before, the slope of the regression lines is similar (fig. 2).

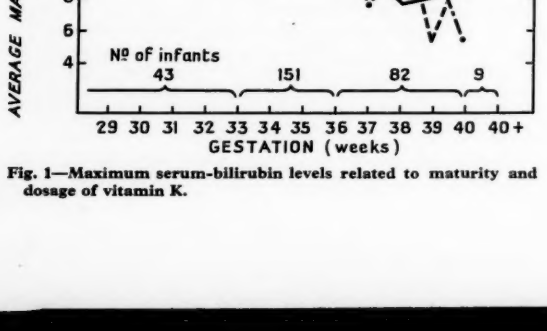

Fig. 1—Maximum serum-bilirubin levels related to maturity and dosage of vitamin K.

Discussion

That the brain damage of kernicterus results from high levels of unconjugated bilirubin in the blood-plasma is now well established (Day 1954, Lathe 1954, Waters and Britton 1955, Zetterström and Ernster 1956). Fat-soluble bilirubin is excreted by conjugation with glucuronic acid in the liver to form water-soluble glucuronides (Lathe and Walker 1957). There is evidence that in the newborn

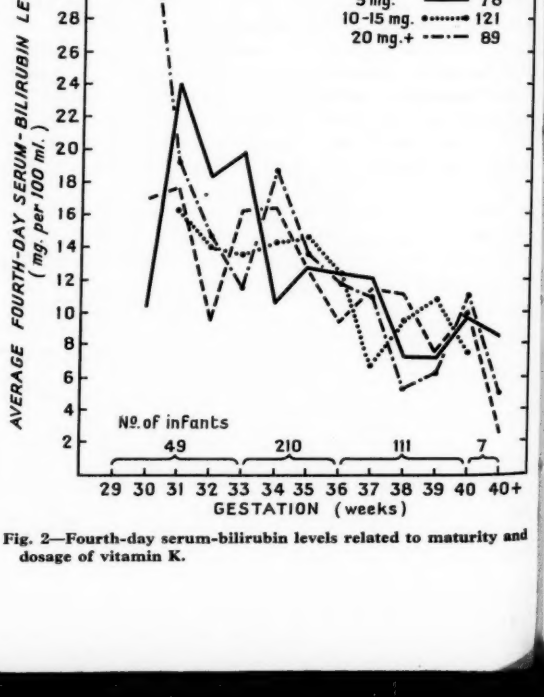

Fig. 2—Fourth-day serum-bilirubin levels related to maturity and dosage of vitamin K.

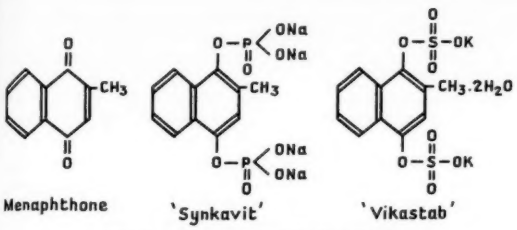

Fig. 3—Synthetic vitamin-K analogues.
Menaphthone (2-methyl-1 : 4 naphthoquinone) has much vitamin-K activity and is reasonably stable; 'Synkavit' (diphosphoric acid ester of 2-methyl-1 : 4 naphthohydroquinone) and 'Vikastab' (dipotassium 2-methyl 1 : 4-naphthalene bisulphate dihydrate) are both water soluble.

infant capacity to conjugate bilirubin is limited, probably because of deficiency in development of the transferase enzyme system; therefore very slight increase in the production of bilirubin is liable to cause high serum levels and severe jaundice. In the most immature infants the enzyme system is likely to be less well developed; hence the frequent appearance of so-called physiological jaundice in immature infants.

Experiments have also shown that conjugation of bilirubin is inhibited by various chemicals, including potassium cyanide, salicylates, and carbon monoxide, and by placental steroids and hypoxia. Clinically, synkavit and 'Sulfasoxazole' have also been associated with hyperbilirubinæmia, and the inference is that these drugs interfere with bilirubin conjugation.

Naturally occurring vitamin K was originally used for treating and preventing hæmorrhage in the newborn; but, as this substance is fat-soluble, intramuscular injections in infants tended to cause abscess formation. Hence synthetic water-soluble analogues have largely replaced this drug in therapy of the newborn. It is of interest that synkavit first came into routine use in Bristol and many other British obstetric departments during 1947.

The basis of all water-soluble analogues of vitamin K is menaphthone, and various radicles are added—synkavit differs from vikastab in that the disodium-phosphate radicles are replaced by dipotassium sulphate (fig. 3). In this trial we have shown that hyperbilirubinæmia was related only to immaturity, confirming the findings of Billing et al. (1954), and that vikastab had no effect on its development when given intramuscularly in small or larger doses during the first two days of life. We may assume, therefore, that vikastab does not inhibit conjugation of bilirubin.

Conclusions

From this study the following conclusions may be drawn:

1. Hyperbilirubinæmia in premature babies is primarily related to immaturity.

2. The synthetic vitamin-K preparation, menaphthone dipotassium bisulphate ('Vikastab'), did not seem to influence the development of hyperbilirubinæmia in immature babies when given intramuscularly in divided doses up to a maximum total dose of 60 mg. during the first two days of life, nor was the risk of kernicterus increased.

If a vitamin-K water-soluble analogue is considered necessary for a newborn infant, it is desirable that the preparation chosen should not interfere with the normal processes of bilirubin excretion. Vikastab seems to be safe and it can if necessary be given in considerably higher dosage than synkavit.

Summary

Serial serum-bilirubin levels have been studied in 436 newborn premature infants to determine the maximum level of bilirubin.

The maximum and fourth-day serum-bilirubin levels of premature infants given a synthetic vitamin-K preparation—menaphthone dipotassium bisulphate ('Vikastab')—in various dosages intramuscularly during the first two days of life have been compared with the serum-bilirubin levels of an unselected group of premature infants who had no vitamin-K analogue.

The development of hyperbilirubinæmia was related to immaturity, and was unaffected by this vitamin-K analogue even in relatively high doses.

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BLOOD-VOLUME IN ELDERLY ANÆMIC PATIENTS FOLLOWING BLOOD-TRANSFUSIONS

STIG BRYDE ANDERSEN
M.D. Copenhagen

From Surgical Department A and the Department of Clinical Biochemistry and Physiology, Bispebjerg Hospital, Copenhagen

IN elderly anæmic patients the majority of surgeons attempt to obtain a normal hæmoglobin level preoperatively by means of blood-transfusions; but such transfusions may overload an already weak cardiovascular system.

In 1909 Boycott and Douglas determined the blood-volume in three rabbits daily for a period. These animals received two to three transfusions at intervals of some days. The transfusions comprised 25–40% of the blood-volume prior to transfusion. Boycott and Douglas found that the blood-volume did not alter but that the cell-volume increased more or less according to the quantity of cells administered, while the plasma-volume fell correspondingly.

Following subsequent investigations (Boycott and Douglas 1910, Boycott and Oakley 1933, 1934) Boycott revised his opinion and concluded that it was the plasma-volume that was regulated. After transfusion the blood-volume rose according to the quantity of cells infused, while the plasma-volume remained unchanged.

In more recent years similar studies have been made in dogs (Deavers et al. 1957, Huggins et al. 1956, 1957, 1958, Smith et al. 1956, 1959). Otherwise there have been very few such investigations (Guyton et al. 1950, 1951, Spencer 1951).

These investigations have one finding in common—namely, that plasma disappears from the circulating blood after a blood-transfusion. Occasionally, more plasma disappears than is infused. With large transfusions, corresponding in volume to the blood-volume before trans-

TABLE I—DATA ON THE 24 PATIENTS BEFORE TRANSFUSION

Case no.	Sex	Age (yr.)	Height (cm.)	Body-weight (kg.)	Hb (g. per 100 ml.)	
					I	II
1	M	64	178	76·5	12·9	14·1
2	F	72	160	70·0	11·8	13·5
3*	F	41	164	52·0	14·7	15·7
4	F	46	161	44·8	9·5	11·7
5	F	55	164	59·4	9·0	12·6
6*	F	78	163	46·0	11·7	12·1
7*	F	54	160	44·0	11·8	14·7
8	F	55	159	51·0	10·8	14·8
9*	M	67	168	51·0	13·6	14·9
10*	F	53	162	69·5	10·4	15·5
11	F	53	166	46·5	6·1	11·8
12	M	54	170	67·5	9·5	13·6
13*	F	58	155	77·5	9·5	12·9
14*	M	72	176	52·5	9·8	14·9
15	F	57	143	55·0	8·6	15·2
16	F	61	160	73·5	11·5	14·8
17	M	37	179	67·0	11·1	13·9
18	F	40	168	44·5	11·1	14·7
19*	M	79	160	51·5	9·6	14·2
20	M	62	169	55·0	9·5	13·9
21	F	45	166	55·6	9·9	14·8
22	M	65	165	70·3	6·5	14·9
23	M	77	159	46·0	8·9	16·0
24*	M	75	179	70·0	7·8	13·0

Hb I = before transfusion. Hb II = after transfusion.
* These patients had malignant disease.

fusion, it is difficult to account for the entire quantity of cells given in the transfusion. The phrase "trapped cells" is employed in this connection (Huggins et al. 1956, Smith et al. 1956). Various investigations suggest that this quantity of cells is trapped particularly in the liver (Deavers et al. 1957). With smaller transfusions the increase of cell-volume corresponds to the volume infused.

In man the conditions have been investigated particularly in patients submitted to operations (e.g., Norlander 1955, Prentice et al. 1954, Wiklander 1956, Williams and Parsons 1958). In man in a steady metabolic state, only a few investigations have been undertaken—as a rule on a small scale. (Korth 1941, Pellegrini 1934, Wetzel 1939, Wollheim and Schneider 1958.)

The most thorough investigations were undertaken by Wollheim and Schneider. These workers found that, after a transfusion of approximately 10% of the original blood-volume, the blood-volume increased in some patients but not in others. In the former group the blood-volume was on average 70 ml. per kg. body-weight, while in the latter group it was 77 ml. per kg. These workers therefore consider that the changes in the blood-volume depend on the magnitude of the blood-volume before transfusion. However, it does not appear clearly from their article whether this difference is statistically significant. It is furthermore doubtful whether this classification of the material is statistically correct.

Material

In table I the data concerning the patients are tabulated. Columns 6 and 7 show the hæmoglobin levels before and after transfusion.

A total of 24 patients (10 males and 14 females) was investigated. These patients will be analysed together as the results do not differ for the sexes. Their average age was 58 years. 9 had cancer of the alimentary canal and the remainder had non-malignant diseases. Cardiac disease was not demonstrated in any patient.

During the period of investigation none of the patients was submitted to operation and none had hæmorrhage.

Methods

Blood-volume was determined between one and twenty-four hours before the first transfusion, and again between two hours and four days after the last transfusion.

All patients received at least two transfusions; some received three or four transfusions, and 1 received ten transfusions in the course of ten days. No patient received more than two transfusions in one day. Each transfusion consisted of 450 ml. blood, of which 250 ml. was plasma and 200 ml. blood-cells. 60 ml. ACD solution was added to each bottle of blood as an anticoagulant. These values were not worked out for each individual bottle of blood, but the results of spot tests agreed with these values.

The plasma-volume was determined with T-1824, by Jarnum's (1959) modification of Allen's (1953) extraction method.

The blood-volume was determined from the plasma-volume by means of the hæmatocrit value. The body hæmatocrit was calculated from the venous hæmatocrit by correcting with the factor 0·91 (Chaplin et al. 1953).

The venous hæmatocrit was determined on heparinised blood in a modified Wintrobe tube rotated for half an hour at 3000 r.p.m with a radius of 15 cm to the centre of the column of blood-cells. The venous hæmatocrit was corrected for "plasma trapping" with the factor 0·94, which was determined for the centrifuge employed for the hæmatocrit determinations. The formula for the blood-volume (B.V.) was thus:

$$\text{B.V.} = \frac{\text{plasma-volume} \times 100}{100 \div (\text{hæmatocrit} \times 0{\cdot}94 \times 0{\cdot}91)}$$

In order to control reproducibility, the blood-volume was determined at intervals of a few days in 5 of the patients during a period in which they did not receive treatment. In 4 of the patients the blood-volume was determined twice and in the 5th thrice. The variations in the blood-volume in relation to the first blood-volume recorded were: −3·2%, −4·6%, +1·5%, −0·3%, +0·9%, +0·3%.

In all the blood-volume determinations Kjeldahl analysis was undertaken on the serum to determine the total protein, and a conversion factor of 6·25 was employed. The serum-proteins were fractionated by means of paper electrophoresis by the method of Laurell et al. (1956). The total circulating albumin, circulating globulin, and circulating γ-globulin before and after transfusions were calculated. The hæmoglobin was determined spectrophotometrically from dilution of oxyhæmoglobin.

Results

The following is a typical example of the investigation and its results:

The patient, a man aged 77, had a duodenal ulcer with melæna and hæmatemesis. No gastrointestinal hæmorrhage had occurred in the week before the first day of the period of the investigation.

1st day.—Blood-volume (B.V.) I = 2850 ml. (62·0 ml. per kg.); plasma-volume (P.V.) I = 2230 ml. (48·5 ml. per kg.); cell-volume (C.V.) I = 620 ml. (13·5 ml. per kg.); Hb I = 8·9 g. per 100 ml.

2nd-5th days.—Transfusion 1 bottle of blood on each of these four days: total 1800 ml. (i.e., $Tr._{B.V.}$ = 1800 ml., $Tr._{P.V.}$ = 1000 ml.,

TABLE II—BLOOD-VOLUME, PLASMA-VOLUME, AND CELL-VOLUME BEFORE AND AFTER TRANSFUSIONS, AMOUNT OF BLOOD TRANSFUSED, AND PLASMA AND CELL CONTENT OF TRANSFUSED BLOOD

Case no.	B.V. I (ml.)	P.V. I (ml.)	C.V. I (ml.)	$Tr._{B.V.}$ (ml.)	$Tr._{P.V.}$ (ml.)	$Tr._{C.V.}$ (ml.)	B.V. II (ml.)	P.V. II (ml.)	C.V. II (ml.)
1	6260	4180	2080	900	500	400	6660	4070	2590
2	4270	3000	1270	900	500	400	4290	2620	1670
3	4190	2760	1430	900	500	400	4340	2610	1730
4	3740	2740	1000	900	500	400	4090	2680	1410
5	3690	2750	940	900	500	400	3690	2440	1250
6	3570	2340	1230	900	500	400	3900	2480	1420
7	3320	2310	1010	900	500	400	3440	2190	1250
8	4760	3340	1420	1350	750	600	4390	2700	1690
9	3960	2650	1310	1170	650	520	4950	2790	2160
10	4380	3080	1300	1350	750	600	3910	2290	1620
11	5730	4760	970	1800	1000	800	6520	4620	1900
12	5660	4140	1520	1800	1000	800	5970	3700	2270
13	4260	3060	1200	1350	750	600	4940	3140	1800
14	4220	3020	1200	1350	750	600	4740	2790	1950
15	2770	2100	670	900	500	400	3200	1950	1250
16	4100	2670	1430	1350	750	600	4360	2590	1770
17	4890	3380	1510	1800	1000	800	6380	3970	2410
18	4720	3270	1450	1800	1000	800	5620	3380	2240
19	4360	3160	1200	1800	1000	800	4180	2550	1630
20	5080	3770	1310	2250*	1250	1000	5250	3310	1940
21	3910	2830	1080	1800	1000	800	4130	2440	1690
22	3730	3050	680	2250	1250	1000	4070	2510	1560
23	2850	2230	620	1800	1000	800	3050	1780	1270
24	6010	4540	1470	4500	2500	2000	7980	5090	2890

Symbols are explained in text.
* This patient received in addition to the blood-transfusion one litre of human plasma during the period of investigation.

$Tr._{C.V.}$ = 800 ml., where $Tr._{B.V.}$ is the amount of blood transfused, and $Tr._{P.V.}$ the volume of plasma, and $Tr._{C.V.}$ the volume of cells contained in the transfused blood).

6th day.—B.V. II = 3050 ml.; P.V. II = 1780 ml.; C.V. II = 1270 ml.; Hb II = 16·0 g. per 100 ml.

$$\frac{\text{B.V. I}+Tr._{B.V.}}{\text{B.V. I}} = 163\% \qquad \frac{\text{B.V. II}}{\text{B.V. I}} = 107\%$$

$$\frac{\text{C.V. I}+Tr._{C.V.}}{\text{C.V. I}} = 229\% \qquad \frac{\text{C.V. II}}{\text{C.V. I}} = 209\%$$

$$\frac{\text{P.V. I}+Tr._{P.V.}}{\text{P.V. I}} = 145\% \qquad \frac{\text{P.V. II}}{\text{P.V. I}} = 80\%$$

Thus after four transfusions totalling 1800 ml. (63% of the original blood-volume) the hæmoglobin level had increased from 8·9 g. per 100 ml. to 16·0 g. per 100 ml.; but the rise in blood-volume was only 200 ml. (7%). The cell-volume increased more or less according to the quantity administered, while the plasma-volume decreased.

Table II shows the volumes before and after transfusions for all the patients, the amount of blood transfused, and the plasma- and cell-volume in the transfused blood. The cases are arranged in order according to the amount of blood transfused: this amount is expressed as volume of blood transfused in relation to blood-volume before transfusion $\left(\frac{Tr._{B.V.}}{\text{B.V. I}} \times 100\right)$. Thus it should be possible to compare results from two patients even if they have very different blood-volumes.

Fig. 1 represents graphically the changes in the blood-volume in each case. All volumes are expressed as percentages of blood-volume before transfusion, so values higher than 100% indicate that blood-volume has increased after transfusions, while values below 100% indicate that blood-volume has decreased after transfusions.

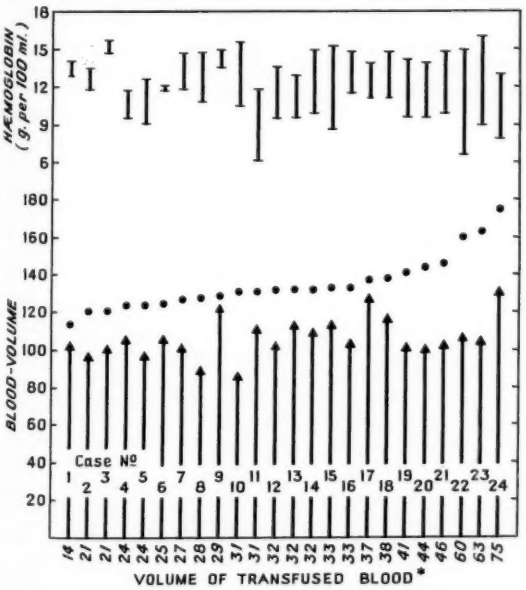

Fig. 1—Changes in blood-volume after transfusion.

Arrows indicate blood-volume actually found after transfusion $\left(\frac{\text{B.V. II}}{\text{B.V. I}} \times 100\right)$. The average was 109% (range 89–133%).

Closed circles indicate calculated blood-volume if this volume increased according to the volume transfused $\left(\frac{\text{B.V. I}+Tr._{B.V.}}{\text{B.V. I}} \times 100\right)$. The average was 136% (range 114–175%).

* *Transfused volume of blood* $= \frac{Tr._{B.V.}}{\text{B.V. I}} \times 100$.

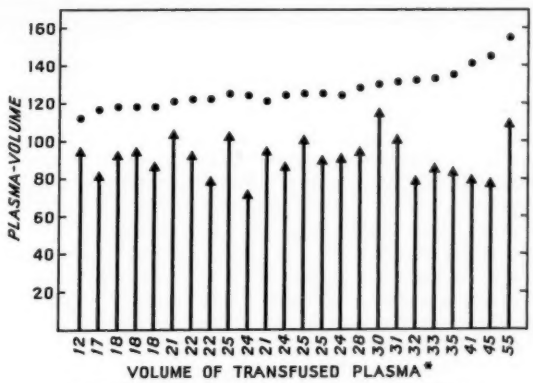

Fig. 2—Changes in plasma-volume after transfusion.

Conversions as in fig. 1.

Arrows $= \frac{\text{P.V. II}}{\text{P.V. I}} \times 100$. The average was 94% (range 74–117%).

Closed circles $= \frac{\text{P.V. I}+Tr._{P.V.}}{\text{P.V. I}} \times 100$. The average was 128% (range 112–155%).

* *Volume of transfused cells* $= \frac{Tr._{P.V.}}{\text{P.V. I}} \times 100$.

Fig. 1 shows that in no case did the blood-volume increase by the quantity transfused. In 2 cases, however, lower blood-volumes were found after transfusion than before transfusion, and in 2 cases the blood-volume was unaltered. There is only a very slight tendency for the blood-volume to increase when the magnitude of the transfusion is increased. On average, the patients received transfusions amounting to 36% of the original blood-

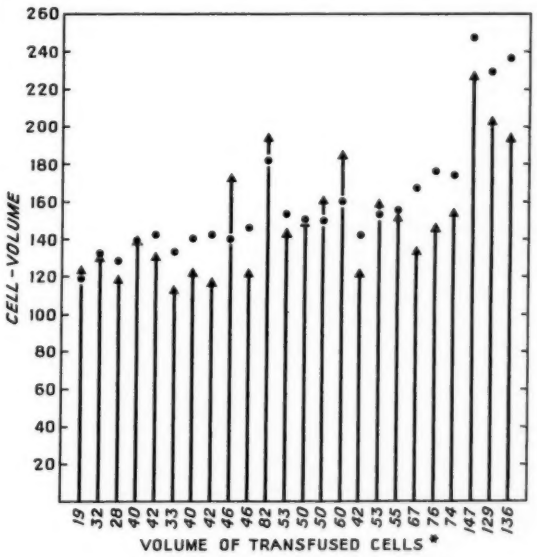

Fig. 3—Changes in cell-volume after transfusion.

Conversions as in figs. 1 and 2.

Arrows $= \frac{\text{C.V. II}}{\text{C.V. I}} \times 100$. The average was 152% (range 119–229%).

Closed circles $= \frac{\text{C.V. I}+Tr._{C.V.}}{\text{C.V. I}} \times 100$. The average was 160% (range 119–247%).

* *Volume of transfused cells* $= \frac{Tr._{C.V.}}{\text{C.V. I}} \times 100$.

volume, and they reacted to this with an average increase of 9%, with rather extensive scatter round this figure.

Fig. 2 shows plasma-volumes expressed similarly to the total blood-volumes (fig. 1). In most cases the plasma-volume fell after transfusions, denoting that more plasma disappeared from the circulating blood than was infused. In only 6 cases did the plasma-volume increase, and in no case was the increase as large as the quantity of plasma infused. There was no tendency to increase or decrease with increase in the magnitude of the transfusion. The average amount of plasma administered to each patient corresponded to 28% of the original plasma-volume; and, on average, the plasma-volume fell by 6%.

Fig. 3 shows cell-volumes. The increase in the cell-volume was found to lie at the lower limit of that which might be anticipated. On average, 60% of the original cell-volume was administered in the transfusion, and on average only 52% rise was found; this difference is statistically significant. In 5 cases the cell-volume increased by a greater volume than that administered by transfusions. If this is not due to an error in the method, it may be attributable to the fact that body hæmatocrit has become lower or that capillary permeability has become greater after transfusions so that the plasma-volume and with it the cell-volume is estimated too high.

The average serum-proteins after transfusions, expressed as percentages of the pre-transfusion levels, were as follows:

Albumin 103% (range 65–134%).
Globulin 101% (range 70–127%).
γ-globulin 102% (range 73–139%).

Thus the circulating quantities of albumin, globulin, and γ-globulin remained, on average, the same after the transfusions despite the relatively large quantities of protein in the transfused blood. This holds true for all the fractions investigated, despite the difference in the size of molecules. The scatter was fairly wide.

Discussion

The material investigated is far from uniform as regards both the patients and the experimental conditions. Both the volume of the transfusions and the time which elapsed between the transfusion and the determination of the blood-volume varied greatly. This restricts the conclusions which may be drawn.

No relationship was found between the magnitude of the blood-volume per kg. body-weight before transfusion and the changes resulting from transfusion. Thus the postulates of Wollheim and Schneider (1958) were not confirmed.

There can be no doubt that after transfusion considerable quantities of plasma and protein disappear from the circulating blood—probably into the extracellular spaces. This cannot be proved directly as the methods available for determining the extracellular space in man have an experimental error of approximately one litre (Ikkos and Luft 1957).

The several investigators who have expressed the opinion, following experiments on animals, that the plasma-volume and not the total blood-volume is regulated following blood-transfusion found that the plasma-volume was unchanged while the blood-volume rose in accordance with the volume of cells administered (Krumbhaar and Chanutin 1922, Seavers and Price 1949). The reason for this finding may be that the blood-volume was determined so soon after the transfusions that the regulating mechanism had not yet operated completely. The findings in 7 of the patients in the present investigation support this hypothesis. In these patients the blood-volume was determined immediately after transfusion and two to four days after that. In the interval between these two determinations the blood-volume decreased to about the original value. This took place by reduction in the plasma-volume, while the cell-volume remained more or less unchanged.

This reduction of plasma-volume explains the following observation: during the first days after transfusion treatment has been terminated the hæmoglobin-level of the blood often increases by 10–20%.

Certain investigations suggest that this regulation of blood-volume may be explained by simple physicochemical forces: (*a*) increase of venous pressure (e.g., Valsalva's manœuvre (Brown et al. 1948) causes diffusion of fluid from the circulating blood: (*b*) the venous pressure is slightly raised for a long time after a blood-transfusion, probably until the blood-volume is normal again (Gauer et al. 1956); (*c*) after infusion of plasma-expanders the capillary permeability appears to be increased (Wasserman et al. 1955). It appears reasonable to assume that blood-transfusions have the same effect. Future investigations will reveal what this implies for the exactitude of the plasma-volume determinations by protein-tagging methods following blood-transfusions.

The regulation of blood-volume after transfusions may therefore be explained as follows: the increase in hydrostatic pressure in the veins associated with increased capillary permeability causes the loss of plasma and protein from the circulating blood.

Conclusions

The object of the present investigation was to establish the extent to which blood-volume is increased in elderly people who receive blood-transfusions.

It was found that in elderly anæmic people (average age 58 years) in a steady metabolic state blood-transfusions amounting to 14–75% (average 36%) of the original blood-volume produce: (*a*) an increase in cell-volume approximately corresponding to the quantity of cells administered; (*b*) a reduction of plasma-volume; (*c*) a slight increase in total blood-volume (average 9% of the original blood-volume).

I suggest that the total blood-volume, and not only plasma-volume, is regulated by simple physicochemical forces which displace fluid and proteins from the circulating blood into the extracellular spaces.

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A MONGOL GIRL WITH 46 CHROMOSOMES

P. E. POLANI
M.D. Pisa, M.R.C.P.

J. H. BRIGGS
M.B. Lond., M.R.C.P.

OF GUY'S HOSPITAL MEDICAL SCHOOL, LONDON, S.E.1

C. E. FORD
Ph.D. Lond.

C. M. CLARKE
Ph.D. Durh.

OF THE MEDICAL RESEARCH COUNCIL RADIOBIOLOGICAL RESEARCH UNIT, HARWELL, BERKS

J. M. BERG
M.B. W'srand, M.Sc. Cape Town

OF THE FOUNTAIN HOSPITAL, LONDON, S.W.17

THAT mongols have 47 chromosomes and are trisomic for one of the two short pairs of acrocentric chromosomes has been invariably demonstrated in the 30 cases reported so far (Lejeune et al. 1959a and b, Jacobs et al. 1959, Ford et al. 1959, Böök et al. 1959). These two chromosome pairs are numbers 22 and 23 of Ford et al. (1958), and, although they were not distinguished, it is now recognised that one is a little longer than the other and may exhibit a small "satellite" to the short arm. Since there is now evidence that it is the longer satellited chromosome that is implicated in mongolism (Tjio and Puck 1958, Chu and Giles 1959), we shall refer to this chromosome as no. 22.*

"Non-disjunction" at one of two meiotic divisions during gametogenesis, leading to the production of a gamete with 24 instead of 23 chromosomes, is the most probable origin of trisomy. Because of the well-known maternal age effect in mongolism (Shuttleworth 1909, Jenkins 1933, Penrose 1933, 1934) it is generally assumed that the error is more likely to be one of oögenesis than of spermatogenesis. Possibly other factors than those associated with advancing maternal age may cause mongolism, and it is conceivable that mongolism might arise through other chromosomal mechanisms, in which case chromosome studies might reveal the postulated differences.

It is difficult to select mongols in whom such special ætiological factors and/or chromosomal mechanisms might have operated. One approach might be dictated by the following considerations:

It is likely that most mongols whose chromosomes have been studied and reported on were the offspring of older mothers. The distribution of maternal ages at the birth of mongol children is known to be skew to the left and often frankly bimodal, as Penrose (1951, 1954a) has pointed out, with a peak at the average maternal age for normal controls and the major peak at a considerably higher age. This skewness and bimodality can be interpreted as an expression of ætiological heterogeneity in respect of factors that relate mongolism to maternal age. Furthermore, when mongolism is found in maternal (but not paternal) ascendants and collaterals, the *mean* maternal age at the birth of mongol children is significantly lowered (Penrose 1951). This also happens in the group of mothers who have more than one mongol child, though it is difficult to discern how much the lowering of the mean maternal age is independent of that which will automatically result from "having to fit" more than one affected child into a sibship (Penrose 1951). The lowering of maternal age in familial mongolism may indicate that genetic factors (in the mother) may increase the frequency with which "non-disjunction" occurs and render it less dependent upon advancing maternal age.

It appeared that a study of the chromosomes of mongols born to young mothers might be rewarding. It can be thought that this group may be compounded of at least three subgroups: (1) where the condition is related to the same causes which produce mongols from older mothers; (2) where mongolism is familial (through the mother) or shows sibship concentration or both; and (3) a residual and probably miscellaneous subgroup where yet other factors than the above *may* operate.

Material

We selected three mongol children because they were born from *young* mothers and there was no sibship or family concentration of mongolism. Bone-marrow suspensions from these three mongols were sent to Harwell. The observers there knew that the marrows were from mongols but did *not* know the special reason for the investigation or the criteria of selection of these patients. Of these three marrow cultures, one failed and another yielded a chromosome count of 47, with trisomy of one of the two short acrocentric chromosomes presumably chromosome 22. The result in the third is the object of this communication.

Case-record

A, a female born on Dec. 29, 1949, weighing 6 lb. 14 oz., was diagnosed neonatally as a mongol. Her mother, who was 21, had an uneventful pregnancy. She was X-rayed repeatedly for inactive pulmonary tuberculosis (Dec. 13, 1948, and March 21, July 4, Aug. 29, and Oct. 31, 1949). A's father was 23 years of age. There is no family history of mongolism, mental defect, or any other abnormalities. The mother had one other pregnancy resulting in the birth of a normal male in 1952. A is a typical mongol and shows no associated abnormalities (fig. 1). She was admitted to the Fountain Hospital at the age of $3^1/_4$ years. Her intelligence-quotient has varied between 38 and 40 on repeated testing on the Merrill-Palmer scale or the Stanford-Binet (T.M. revision) form L. Each palmar A T D angle (Penrose 1954b) measures 91°.

Fig. 1—Mongol child, aged 10 years.

Cytological Observations

The marrow was processed according to the technique of Ford et al. (1958). Preparations were made and examined independently by two observers (C. E. F., C. M. C.). Their findings, compared after completion of the observations, agreed. The counts, summarised in the accompanying table, show that the chromosome num-

CHROMOSOME COUNTS IN CELLS FROM BONE-MARROW OF A MONGOL GIRL

Observer	Chromosome count					Total cells	
	43	44	45	46	47	Counted	Analysed
C. M. C. ..	..	..	..	21	..	21	7
C. E. F. ..	2	2	2	39	..	45	8
Totals	2	2	2	60	..	66	15

*The need for standard numbering of human chromosomes is accepted, and it is hoped that agreement on classification will soon be reached. Meanwhile, it is best for each group to adhere to its own system.

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ber was 46. On detailed analysis of 15 cells, only 4 short acrocentric chromosomes were found, as in normal females (fig. 2). Of the group of 6 chromosomes of pairs 14, 15, and 16 normally present, 5 were found; but there were 17 medium-length chromosomes instead of 16 as in a normal female. Careful matching of these chromosomes in photographs of five cells revealed that the " extra " was not certainly distinguishable from the two members of pair no. 12. The great similarity of pairs 14, 15, and 16 made it difficult to determine which of them was represented singly. It is considered most likely to be no. 15, and accordingly what is believed to be the extra chromosome is placed beside a single " chromosome 15 " in fig. 3.

Interpretation

On present knowledge it is difficult to believe that there might be a genetic mechanism causing mongolism that did not involve the presence in triplicate of at least the greater part of chromosome 22. The clinical diagnosis of mongolism in the present case is undoubted, and it is therefore reasonable to suppose that the " extra " chromosome is compounded of the greater parts of the missing chromosome ?15 and of the expected additional chromosome 22. The literature of cytogenetics does not support the possibility of a permanent end-to-end fusion of two chromosomes, such as these, by their short arms (v.i). Therefore, the most likely interpretation of the finding is an unequal reciprocal translocation between chromosomes ?15 and 22 with both points of exchange close to the centromere (fig. 4). The morphology of the " extra " chromosome is entirely in accord with this interpretation. The long arm corresponds in length to the long arm of a chromosome 15, and the short arm to the long arm of a chromosome 22.

Since the distinction between the pair of chromosomes 12 and the extra chromosome is uncertain, the cytological evidence alone does not exclude trisomy of chromosome 12 combined with monosomy of chromosome ?15 as the explanation. However, the hypothetical combination in one individual of viability of a monosomic condition and of mongolism originating through a chromosomal mechanism entirely different from the one demonstrated hitherto is considered to be so highly unlikely as to justify rejection.

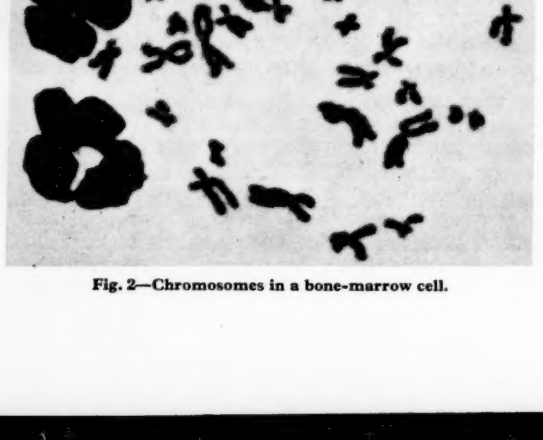

Fig. 2—Chromosomes in a bone-marrow cell.

An alternative mechanism by which mongolism might come to be expressed in an individual with 46 chromosomes is through the origin of an *iso*chromosome from the long arm of chromosome 22. These abnormal chromosomes arise very rarely by *misdivision* (Darlington 1939, 1940) at mitosis or meiosis: that is, the centromere divides transversely instead of equationally, yielding two symmetrical, but genetically unequal, products, each being a duplication of one arm of the original chromosome. Since isochromosomes are, by definition, symmetrical about their centromeres, this explanation is excluded in the present case.

Origin of the Defect

There are five formal possibilities of the origin of such a translocation, two somatic, two germinal, and one which is both germinal and somatic. It may have taken place: (1) during embryogenesis from a zygote with a normal complement of 46 chromosomes, or even locally in the bone-marrow after embryogeny was complete; (2) during embryogenesis from a zygote with the 47 chromosomes usual in mongolism, or again at a later stage locally in the bone-marrow; (3) during gametogenesis in one of the parents; (4) during embryogenesis in one of the parents with consequent involvement of all or part of one or both gonads; (5) during embryogenesis or gametogenesis of one of the four grandparents.

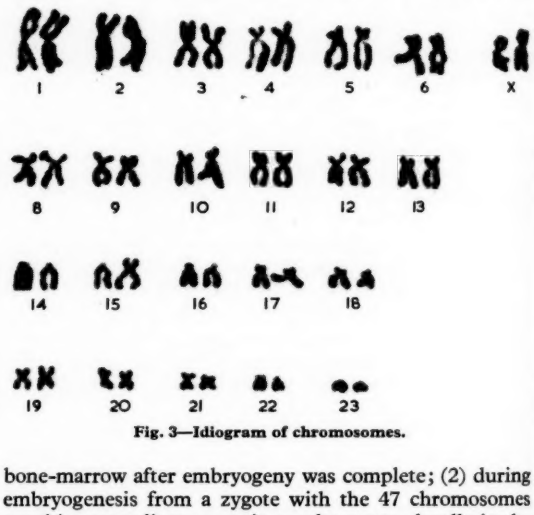

Fig. 3—Idiogram of chromosomes.

The first possibility could only come about as a consequence of a rearrangement (a symmetrical chromatid interchange) occurring after the chromosomes had reproduced in preparation for the next anaphase separation.

This restriction does not apply to the second possibility: the observed abnormality could be derived from a 47-chromosome mongol complement by rearrangement either *before or after* chromosome reduplication. In either case, however, the loss of the smaller of the two products of the rearrangement would be necessary to yield the observed set of 46 chromosomes.

If the first cleavage division is excluded, both possibilities, whether occurring early or late in development history and whether locally in bone-marrow or elsewhere, would lead to chromosomal mosaicism (i.e., the presence in the body of two types of cell differing in chromosome constitution). In view of its wide regional distribution, the looseness of its structure, and the ready migration of stem cells from one region to another, bone-marrow is the tissue par excellence in which chromosomal mosaicism (if present) might be detected. The observations give no hint of it.

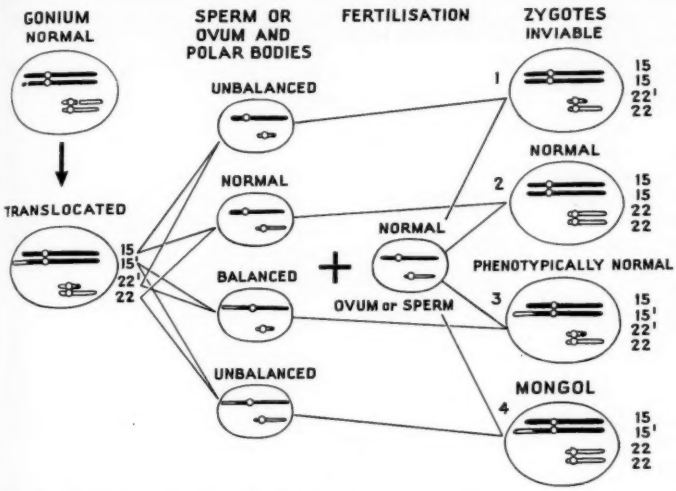

Fig. 4—Diagram showing suggested origin of the translocation and its genetic consequences.

For illustration, the translocation is shown as having occurred in a spermatogonium or oogonium. In the latter case, only one of the meiotic products becomes a functional gamate; the others become polar bodies. If the translocation originated earlier in development, the change would be propagated at each mitosis and more gonia would be affected in the same way. The exact positions of breakage cannot be defined and the points indicated have been chosen arbitrarily.

Offspring:

1 is a chromosomally unbalanced (presumably) inviable zygote.

2 is normal, phenotypically and chromosomally.

3 is chromosomally balanced, phenotypically normal. He is chromosomally distinct and will produce the same types of gametes and offspring as the affected parent.

4 is a mongol like A.

There are also the morphological consequences of postulates 1 and 2 to consider. A mosaic of the first type would be genetically normal in part of the body. Some hint of regional difference might therefore have been detected at clinical examination—such as the absence of the usual stigmata of mongolism on one hand or foot. The second case is different. Both components of the mosaic would, by hypothesis, contain the chromosome material necessary for the expression of mongolism, and morphological indications of mosaicism would not be expected. Although neither of the two mosaic possibilities can be rigorously excluded on the present evidence, neither is likely.

The third and fourth possibilities differ principally in their genetic implications and both could apply to *either parent*. If the translocation had occurred in a single primary spermatocyte or oöcyte, then at most two gametes would have carried the rearranged chromosome and both would have been shed together. But it is equally possible that the translocation took place during embryonic development of one parent, or even later, and that several, many, or even all gonia are affected. The parent would then be a gonosomic mosaic, a "name . . . used for cases where mosaicism is due to a difference in genetical (*or chromosomal*) constitution between all or part of the soma and all or part of the gonads" (Sidky 1939–40).

The fifth possibility is that, in origin and chromosomal make-up, one of the parents of A may be similar to the "phenotypically normal" zygote mentioned above (see fig. 4, zygote 3). The distinct chromosomal make-up would exist both in the gonia and in the somatic tissues, and the hypothesis can be tested by studying the somatic chromosomes of the parents.

The cytogenetic behaviour of reciprocal translocations at gametogenesis is well known in other species. In man gametes of four principal types would be formed in nearly equal numbers. In the present case, assuming that both gonads are wholly affected (and neglecting some rarer types of abnormal gamate), one-quarter of the offspring will be mongols, one-quarter normal, one-quarter phenotypically normal (but chromosomally distinct and reproductively like the parent), and one-quarter of the zygotes produced will be inviable (fig. 4). From a genetic standpoint, the last class (fig. 4, zygote 1) would be practically monosomic for chromosome 22. The most obvious outward manifestation of the last three possibilities would be a sibship and/or family concentration of mongols.

In the present instance, we have no reason for preferring either hypothesis 3, 4, or 5, nor for assigning the origin of the defect to either parent.

The present finding of a different chromosome constitution and hence a different mechanism for mongolism may be a sporadic chance happening, and if so is of limited interest. However, the manner in which the patient was selected suggests that this is not so—in which event the conclusion would be not only that different chromosome mechanisms may underlie mongolism but also that the condition may be brought about as a consequence of different causal factors operating (on either parent) before conception.

This is the second instance of a presumptive translocation to be reported in man. Turpin (1959) and Lejeune (1959) found only 45 chromosomes in dividing cells of three independent tissue-cultures established from fascia lata of a boy with multiple abnormalities of the spine —a condition described as *polydysspondylie*. A single apparently rearranged chromosome was present that was similar to the one identified here, but there were only three instead of four short acrocentric chromosomes. Turpin et al. ascribed their rearrangement to a translocation of the greater part of chromosome V_S (23) on to the long arm of T_2 (15). It is remarkable that, in both these presumptive translocations in man, the exchange appears to have taken place between a long and a short acrocentric chromosome. Furthermore, all the four breaks that must be postulated evidently occurred close to the centromere—two in chromosome no. 15 and one each in no. 22 and no. 23. This suggests that certain chromosome regions may be specially favoured for participation in chromosome rearrangement, but a departure from randomness could also arise secondarily as a consequence of differential survival at the cellular or zygotic level. The chromosomes of pair no. 22 bear satellites on their short arms close to their centromeres; so also do two of the long acrocentric chromosomes—either the longest pair (Tjio and Puck 1958) (no. 14) or the second longest pair (Chu and Giles 1959) (no. 15). It follows that three of the four breaks may have occurred in the neighbourhood of a satellite. The fact that Levan and Hsu (1959) have found nucleolar remnants attached to one of the satellited chromosomes supports the assumption that in man, as in other organisms, the "stalk" which attaches satellite to main chromosome body is the site of a nucleolar organiser. Nucleoli are formed independently in telophase

but are frequently reduced by fusion to a single one by interphase. Hence the satellited chromosomes, and particularly the regions adjoining the nucleolar organisers, would tend to lie near one another. Close association between points of breakage favours the occurrence of chromosome rearrangements (such as reciprocal translocations), and a nucleolar organiser therefore might well influence the probability that structural changes will take place in its vicinity (Darlington 1939), while there exists the possibility of increased tendency to breakage (or reduced restitution) in this neighbourhood (Darlington 1937, Swanson 1958).

The presence of a nucleolar organiser on pair no. 22 may be important in a different way and relevant to the origin of "regular" mongolism. Persistence of nucleolar remnants in meiotic prophase may interfere with the approach and pairing of these two short chromosomes (Darlington 1937) to such a degree that no chiasma is formed (Darlington 1935, Upcott 1936). They would then enter the first meiotic spindle as unpaired bodies (univalents) and assort at random to the poles, so yielding gametes in the proportions 2 normal; 1 nullo-22; 1 duplex-22. The other satellited chromosome (no. ?15) is at least twice as long as chromosome no. 22; and interference of pairing through the same mechanism of nucleolar interference would not be expected to be so severe, if, indeed, it occurred at all.

If this analysis is correct, two conclusions follow: (1) the primary event (failure of chromosome no. 22 to pair) would be four times as frequent as mongolism itself: and (2) two chromosomes no. 22 would be inherited from the one parent without crossing-over having occurred between them—an eventuality that perhaps will be testable in the far future of human cytogenetics.

One further and final point can be made that they may have a bearing on the relationship of mongolism to advancing maternal age. It is generally accepted that all primary oöcytes are differentiated before birth, or at latest very shortly afterwards. The nucleoli in the oöcytes of a 45-year-old woman would therefore have been in existence for 45 years, and it is conceivable that, in consequence of some progressive biochemical change, they would be more resistant to the normal nucleolar breakdown processes that take place in meiotic prophase. Spermatogenesis presents a sharp contrast: there is no reason to suppose that any primary spermatocyte has a life longer than a week or two, so that nucleolar breakdown would be expected to proceed at normal rate and not interfere with meiotic pairing.

Summary

A mongol girl, selected because she was born from a young mother, in contrast with reported chromosome findings in mongols, had only 46 chromosomes in her bone-marrow cells and had four small acrocentric chromosomes like normal females. There were only 5, instead of 6, of the longer acrocentric chromosomes (pairs 14, 15, or 16) but an extra chromosome was present that was not certainly distinguishable from chromosome 12; and this may have carried the major part of the genetic material of chromosome 22.

A reciprocal translocation between chromosomes ?15 and 22 is suggested as the origin of the anomaly. The possibility that it originated during the development of the patient herself is unlikely but not excluded. It is more likely to have occurred in one of the parents, or even a grandparent, possibly during development. If one parent were affected, he or she would be a gonosomic mosaic, and there would be an increased probability of further mongol births, as well as other familial and genetic implications. Were one of the grandparents affected, the genetic implications would be the same, but one of the parents would be distinct in his or her somatic (and germinal) chromosomal make-up.

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CHROMOSOMAL ABNORMALITIES IN FATHER AND MONGOL CHILD

M. FRACCARO
M.D. Pavia
OF THE INSTITUTE OF MEDICAL GENETICS, UNIVERSITY OF UPPSALA, SWEDEN

K. KAIJSER
M.D. Stockholm
OF THE PÆDIATRIC DEPARTMENT, CENTRAL HOSPITAL OF ESKILSTUNA

J. LINDSTEN
Med. kand., fil. kand., Uppsala
OF THE INSTITUTE OF MEDICAL GENETICS, UNIVERSITY OF UPPSALA

SOME mongol patients of each sex have a somatic cell complement of 47, instead of the common 46 chromosomes; and morphological evidence indicates that it is one of the small acrocentric autosomes which is triplicated in the diploid complement (Böök et al. 1959, Ford et al. 1959, Jacobs et al. 1959, Lejeune et al. 1959).

If non-disjunction at parental gametogenesis is responsible for the trisomy in mongol patients it must occur with a relatively high frequency. The incidence of mongolism at birth is difficult to assess, but has been generally estimated as more than 1 in 1000 births (Böök and Fraccaro 1956). The screening of a large number of patients with detailed study of their chromosomes should indicate whether it is likely that all the cases actually have trisomy.

In this paper we describe a mongol boy whose cultured mitotic somatic cells displayed a complement of 46 chromosomes. This chromosome number was at first interpreted as the product of a translocation between 2 of the acrocentric chromosomes usually present in triplicate in mongolism. At subsequent examination of the parent's karyotypes it was, however, found that the mongol's father had 47 chromosomes and was probably trisomic for pair no. 19. (Pending agreement on classification we adhere to our provisional system. The chromosome present in triplicate in mongolism is in this system no. 21.)

Case-record

S is a boy born on June 29, 1959, weighing at birth 4560 g. The mother, who was 37, had an uneventful pregnancy and no history of irradiation of the pelvic region. She had had four other pregnancies resulting in the birth of three normal females

(1941, 1945, 1950) and one normal male (1952), all weighing over 4000 g.

S was diagnosed neonatally as a mongol and admitted to an institution for defective children. At examination at the age of 5 months (fig. 1) the following were noted: flat face with squat nose and oblique palpebral fissures, protruding lower lip, and slightly fissured tongue with enlarged papillæ; evident palmar transverse fold on hands; iliac index 43°, a value which is considered below the normal range and typical of mongolism (Caffey and Ross 1956); distinct systolic murmur. It was not possible to determine his mental status. The father, a minister of religion, was 58 at the birth of S. He has no noteworthy history of illness and appears to be in good health.

Fig. 1—Appearance of the mongol patient.

Cytological Observations

Chromosome Number

Bone-marrow and skin biopsies were obtained from S, a skin biopsy from his father, and a bone-marrow punctate from his mother. The cells were cultured in vitro and handled according to the technique of Fraccaro et al. (1960a). Chromosome counts were performed on both primary and transferred cultures. The results are summarised in the accompanying table. The chromosome number was 46 both in S and in his mother and was 47 in his father.

Karyotype of S

Microscopic examination of more than 60 mitotic cells and detailed analysis of 6 cells (3 from bone-marrow and 3 from skin) by the study of enlarged photomicrographs showed only 4 short acrocentric chromosomes, 1 of them being easily identified (by appearance and arm measurements) as the Y chromosome. 5 chromosomes in the small-size range with submedian centromere were found instead of the 4 normally present.

The chromosomes of pairs nos. 19 and 20 are normally difficult to identify. By arranging them with respect to total arm length *and* centromere position (arm ratio) it is possible, however, to pair off 2 chromosomes with slightly higher arm ratio and total length. In the same way we first "classified" the "5th" chromosome by labelling as such the longest one. The mean length (in arbitrary units) was 1·12 and 1·04 for nos. 19 and 20 and 1·24 for the "5th" chromosome. The mean arm ratios (the long arm divided by the short) were 1·28, 1·21, and 1·18 respectively. At this stage of the analysis (before knowing the father's karyotype) we thought that the "5th" chromosome was the product of a reciprocal translocation between two of the triplicated no. 21 chromosomes. Fig. 2, composed at this stage, shows the "5th" chromosome (indicated by an arrow) placed according to this interpretation.

We had little doubt that the odd short chromosome actually belonged to the pair no. 21. It was thus identified because both its mean length (0·85) and arm ratio (3·17) were greater than those of pair no. 22 (0·77 and 2·44 respectively). Moreover, in good preparations, we found only 1 short acrocentric chromosome displaying satellites, while we usually observe 2 such chromosomes in normal karyotypes and 3 in mongols with 47 chromosomes (Böök et al. 1959).

RESULT OF CHROMOSOME COUNTS

Individual	Type of culture	Chromosome no. ⩽43	44	45	46	47	Total
S	*Bone-marrow:* Primary ..	8	3	3	21	..	35
	1st transfer ..	..	..	..	5	..	5
	Skin: Primary ..	2	3	..	25	..	30
Father	*Skin:* Primary ..	..	..	..	..	2	2
	1st transfer ..	2	2	1	3	19	27
	2nd " ..	1	1	..	..	8	10
	3rd " ..	..	1	1	1	14	17
	4th " ..	..	..	..	1	1	2
Mother	*Bone-marrow:* Primary ..	1	..	..	22	..	23

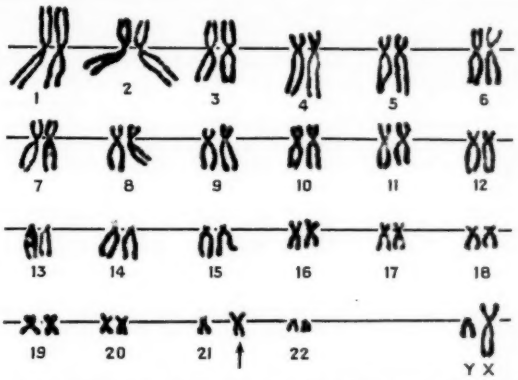

Fig. 2—Karyotype of the mongol boy: 46 chromosomes (arranged from a mitotic skin cell).

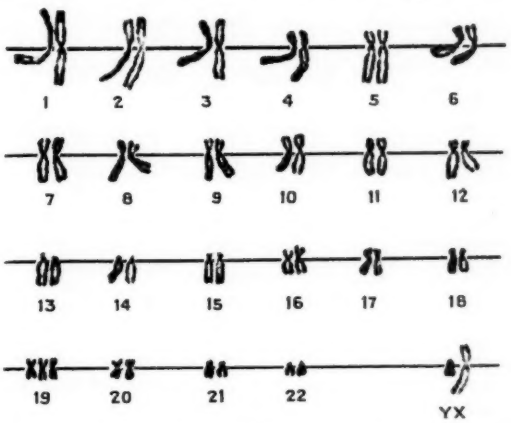

Fig. 3—Karyotype of the father: 47 chromosomes (arranged from a mitotic skin cell).

Karyotype of S's Father

Detailed analysis of 8 mitotic cells showed that the 47th chromosome was small with a submedian centromere. In nearly all the cells counted it was possible to recognise 5 such chromosomes. The 47th chromosome was classified on morphological grounds as homologous to those of pair no. 19 and it was tentatively concluded that the father was trisomic for this chromosome. The chromosomes of fig. 3 are arranged according to this interpretation.

Karyotype of S's Mother

All evidence indicated an apparently normal female karyotype.

RELIABILITY OF THE OBSERVATIONS

There was no evidence for mosaics of two-cell types. In the case of S's father in 2 of the 4 cells with a count of 46 chromosomes it was possible to identify five short submedian chromo-

somes; in the other 2 the chromosomes were very spread, as in the 3 cells with a count of 45 chromosomes in the case of S.

Our observations are based on cells isolated from the donor's body and allowed to divide mitotically in vitro. Whether the abnormalities are produced by some factor(s) inherent in the cell culture methods can be determined on indirect evidence. Cell populations in vitro undergo changes in metabolic patterns, nutritional requirements, and chromosome number. Open system-fluid medium cultures, however, have been recently found to favour karyotype constancy for remarkably long periods (Tjio and Puck 1958, Fraccaro et al. 1960a). When cells of different origin are cultured—e.g., bone-marrow and skin—and both present constancy and equality of karyotype in primary and transferred cultures, it is reasonable to assume that the abnormalities observed have not primarily arisen in vitro. S's cells fulfilled these requirements. From S's father only skin cells were cultured and they showed karyotype uniformity and constancy through 4 transfers.

If mitotic non-disjunction takes place in vitro the resulting abnormal cells may have selective advantages over the others. In our experience, however, based on the examination of cultured cells from some 60 individuals we found no evidence of abnormalities arising in vitro, and karyotype constancy has been the rule for normal and abnormal karyotypes. The only exception was found in a presumptive mosaic of bone-marrow cells with both 45 and 46 chromosomes. In this case evidence indicated that the " normal " cells with 46 chromosomes had a selective advantage during successive transfers (Fraccaro et al. 1960b).

Our results fulfil the requirements of concordance between cells of different origin and uniformity and constancy of karyotype from primary cultures through transfers, and we are therefore inclined to believe that the chromosome abnormalities are characteristic of the individuals.

Interpretation and Discussion

Trisomy in man has so far been found only in individuals with pathological phenotypes. The possibility exists that S's father is a mosaic of normal and trisomic cells and that the skin cells cultured have been sampled from the trisomic sector. But if S's father is trisomic for chromosome no. 19 it follows that trisomy does not necessarily involve pathological manifestations. This might be explained by the assumption that one of the 2 chromosomes is genetically inert as are generally the supernumerary (accessory) chromosomes found in some plant and invertebrate species which are, however, by definition non-homologous to those of the normal complement. These chromosomes are in some animals present in the gonads but inconstant or absent in the somatic cells of adult individuals, and they are generally heterochromatic (Melander 1950).

The report by Kodani (1958) of supernumerary chromosomes in meiotic metaphases in human testes indicates that a similar situation may exist in man. The 47th chromosome in S's father is apparently homologous and constant and is therefore unlikely to be a supernumerary chromosome. No heterochromatic chromosome of this size was found in preparations stained by Feulgen's method nor were characteristic heterochromatic bodies observed in resting nuclei, which were uniformly sex-chromatin negative.

We may interpret the situation in S in two alternative ways:

1. The " 5th " submedian short chromosome is homologous to pair no. 19—i.e., S is trisomic for chromosome no. 19, having received 2 such chromosomes from the father and 1 from the mother. In this case he must be monosomic for pair no. 21.

2. He has received from the father only 1 chromosome no. 19, and the " 5th " chromosome has been produced by a reciprocal translocation between two chromosomes no. 21 with subsequent loss of the other complementary chromosome.

In both cases an error in the division of chromosomes no. 21 must have taken place in either parent's gametogenesis or during his embryonic development.

The total length of the " 5th " chromosome is nearly twice that of the long arms of no. 21. By this criterion the hypothesis of a reciprocal translocation between the 2 acrocentric chromosomes (a situation sometimes called a " centric fusion " [White 1954]) seems likely. On the other hand, arm measurements cannot exclude trisomy of chromosome no. 19. Because of its mean arm ratio above unity the 5th chromosome is unlikely to be an " isochromosome ". These are chromosomes with median centromeres, produced by the duplication of one chromosome arm following a transverse division of the centromere.

It was therefore concluded that it was not possible on morphological evidence to decide between hypotheses (1) and (2). If hypothesis (1) is correct S is trisomic *and* monosomic for two different autosomes. (The monosomic may have originated from failure of chromosome no. 21 to pair at paternal meiosis.) Trisomy and monosomy in the same individual has been considered very unlikely but it has been reported in two cases of mongolism with 46 chromosomes (Böök 1960). It can also be postulated that certain individuals, because of their genetical background and/or because of particular environmental conditions, have a tendency to a " lability " at mitosis or meiosis during their embryonic development or gametogenesis. S's father could be such an individual. If hypothesis (2) is correct, reciprocal translocation may occur also between homologous chromosomes. The two known instances of translocation in human material were between non-homologous chromosomes (Turpin et al. 1959, Polani et al. 1960). Chromosomes no. 21 are satellited and the nucleolar organisers may lie in vicinity during interphase—a condition which may favour the occurrence of structural changes between them (Polani et al. 1960).

The phenotype of S can be explained in the case of hypothesis (1) by the assumption that genes located on the single chromosome no. 21 manifest themselves since they are in a hemizygous state. Under hypothesis (2) S has the greatest part of 3 chromosomes no. 21—a sufficient condition for the phenotypical presence of mongolism, in keeping with the observation by Polani et al.

We have at present no evidence for preferring either of these two hypotheses. We can only reasonably assume that the defect in S is related to the chromosomal anomaly found in the father. The examination of the four apparently normal sibs of S may reveal whether some of them are also trisomic for chromosome no. 19, and we hope to obtain biopsy material in the near future.

Different causal factors may have produced the trisomy in the father. These are those commonly said to account for chromosomal anomalies in man (Polani et al. 1960).

Summary

In the case of a mongol boy the somatic cells had 46 chromosomes, in contrast to the 47 commonly found in mongolism.

The mongol's father, an apparently healthy man, was found to have 47 chromosomes in skin cultures. In the mongol there were only 4 short acrocentric chromosomes, instead of 5; but an extra chromosome was present that was similar to those of pairs nos. 19 and 20. In the father the 47th chromosome was similar to those of pair no. 19.

The father is probably trisomic for chromosome no. 19. The mongol may be trisomic for chromosome no. 19 *and* monosomic for no. 21, or else the extra chromosome may be the product of a reciprocal translocation between 2 chromosomes no. 21. It is not possible, on the evidence available, to decide which hypothesis is correct.

The findings show that fertile, clinically healthy individuals may have a chromosome anomaly and that mongolism may arise from chromosome situations other than the trisomy of chromosome no. 21.

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EXPIRED-AIR RESUSCITATION

J. Cox
M.B. Durh.
SURGEON LIEUTENANT-COMMANDER, ROYAL NAVY

R. Woolmer
V.R.D., B.A., B.M. Oxon., F.F.A. R.C.S.
PROFESSOR OF ANÆSTHETICS, ROYAL COLLEGE OF SURGEONS; SURGEON COMMANDER, R.N.R.

V. Thomas
SICK BERTH PETTY OFFICER (O), ROYAL NAVY

THE standard manual methods of artificial respiration without an artificial airway do not move a tidal volume greater than the victim's dead space in 25–80% of cases (Gordon et al. 1958, Safar 1959), and there is clearly a need for a more efficient method. Expired-air resuscitation has been proposed as such a method, and several reports (Elam et al. 1954, Greene et al. 1957, Safar et al. 1957) indicate that this is indeed efficient. All workers agree that a trained operator can move tidal volumes in excess of 1 litre with every breath, and it has been claimed that the method is easily taught (Safar 1958, Dobkin 1959).

As its use in the Royal Navy was to be considered, and as practical experience of it in Britain was sparse, the method was studied further.

Methods

Twenty-two anæsthetised and paralysed patients undergoing elective surgery were used. Their tidal volume, minute volume, and end-tidal CO_2 tension were measured, and so was the donor's end-tidal CO_2 tension. Oxygen saturation was not measured, as all workers agree that it remains satisfactory during expired-air resuscitation if adequate minute volumes are maintained. Since it has been shown (Nunn 1958, Ramwell 1958) that under the conditions of this study there is a fairly constant relationship between arterial and end-tidal CO_2, it was not thought necessary to make direct measurements of the arterial CO_2 tension.

Choice of patients was limited to those who showed no evidence of respiratory disease, so that, firstly, the end-tidal Pco_2 would be a good measure of $PaCO_2$, and secondly there would be less likelihood of any postoperative respiratory complications, for which the expired-air resuscitation would undoubtedly have been blamed. Operations on the head, neck, thorax, and upper limbs were excluded as the donor and equipment would have been too close to the operative field. Upper-abdominal operations in which either large diaphragmatic excursions or possible gastric distension would interfere with the surgery were also excluded.

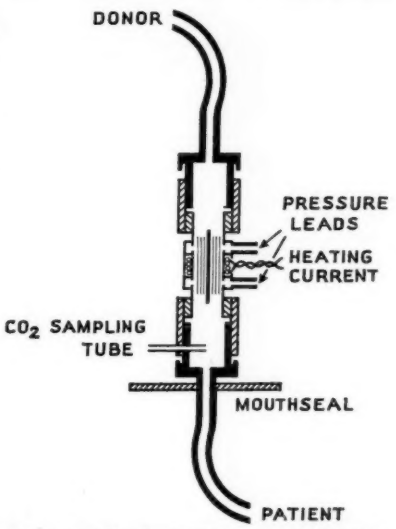

Fig. 1—Double airway and pneumotachograph head.

The mouth-to-airway method (Safar 1958) was used rather than the direct mouth-to-mouth, to facilitate measurement and to avoid æsthetic objections. Considerable difficulty was experienced at first in maintaining an adequate mouthseal, and several types were tried. The most satisfactory, suggested by Mr. D. Hill, consisted of an oval, $5 \times 2^1/_2$ in., of soft $^1/_{16}$ in. rubber sheet with $^1/_4$ in. foam plastic glued on to one surface. The foam plastic formed an airtight joint between the patient's face and the rubber.

A pneumotachograph head (Fleisch 1925) was interposed between the two halves of the double airway, whose volume was 31 ml. (fig. 1). The pressure drop across it was measured by a differential capacitance manometer. The output from this was integrated electrically and recorded by a pen oscillograph. After calibration, tidal volumes could be read directly from the tracing. The screen of the pneumotachograph head was heated electrically to prevent condensation of water altering its resistance. Baseline drift, due to inequality of inspired and expired gas volumes because of diffusion, departure of the respiratory quotient from unity, or leaks at the mouthpiece, was offset electrically. The recording equipment is shown diagrammatically in fig. 2, and pictorially in fig. 3.

Continuous analysis of carbon dioxide was carried out from a sampling-point just distal to the pneumotachograph head (fig. 1) using a rapid infra-red analyser (White 1958). Its output was fed on to the second pen of the oscillograph.

Calibration

Tidal-volume recorder.—Air was passed through the pneumo-

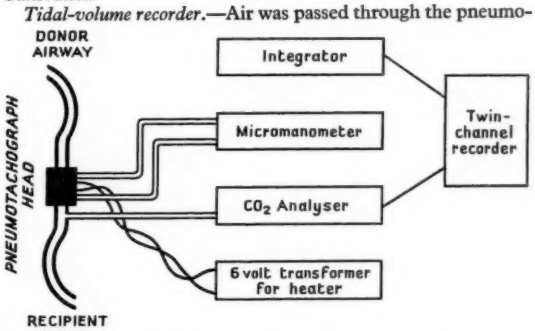

Fig. 2—Block diagram of recording equipment.

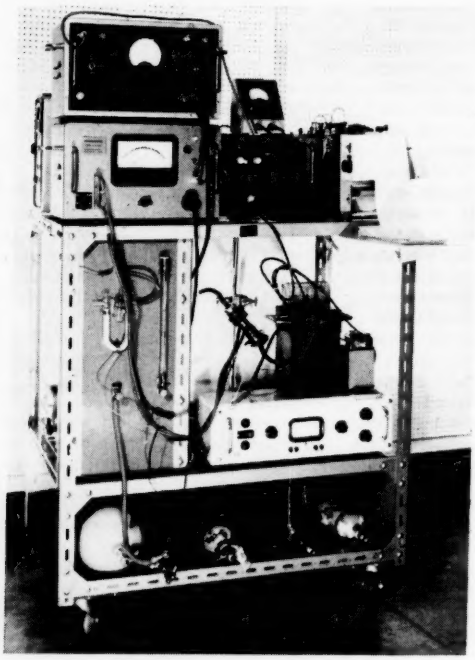

Fig. 3—Recording equipment on trolley.

tachograph head at different flow-rates, which were measured by a rotameter, and the output of the capacitance manometer was fed directly (i.e., without integration) to the oscillograph. The gain of the oscillograph amplifier were held constant and the paper speed was checked against an oscillator. The numerical relationship between the gas-volume passed per unit time and the area below the trace was calculated from this. This area was obtained by counting squares or (later in the study) by planimetry. The electrical integrator was then put into circuit, its ability to perform this calculation accurately at various gas-volumes and flow-rates was checked, and the relationship between the peak height of its tracing and the patient's tidal volume was calculated. The output voltage of the integrator had previously been shown to be a linear function of tidal volume, using a sine-wave pump of variable stroke-volume and rate.

Carbon dioxide.—Three calibrating mixtures of CO_2 in oxygen, covering the expected range, were used. Their exact composition was determined by the method of Scholander (1947). The deflection of the galvanometer of the CO_2 analyser for each of the three concentrations, and for zero, was plotted and a calibration graph was constructed. During use the analyser was frequently calibrated with one of these mixtures. Before use the instrument was allowed to warm up for at least three hours.

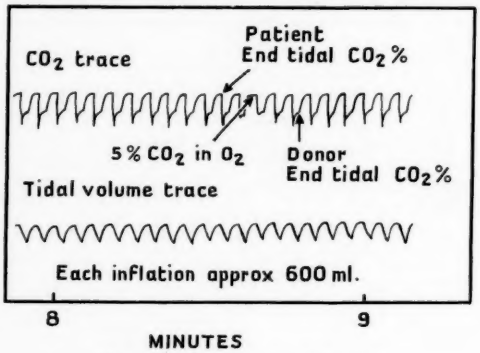

Fig. 4—Record from a typical case.

Errors.—The error due to calibrating with dry air, rather than moist expired air, is undetectable with the system used (Newman 1958). There was no detectable alinearity in the pneumotacograph-manometer-recorder system at gas flows of up to 100 litres per minute. The error in calibrating with carbon dioxide in oxygen instead of in air is of the order of 0·1% v/v over the range of carbon-dioxide levels encountered (Hill 1957).

Results

The twenty-two patients were ventilated by expired-air resuscitation for periods varying from fifteen minutes to one hundred and fifteen minutes. Eight donors were used, none of whom had performed expired-air resuscitation previously. In no instance was difficulty experienced in inserting the airway and starting resuscitation.

Fig. 4 shows a typical example of the tracings obtained; fig. 5 shows the results in one case presented graphically; and in fig. 6 the results of all the cases are charted. The general condition of all patients remained good during expired-air resuscitation. There was no evidence of hypoxia. In two cases there was obvious gastric distension.

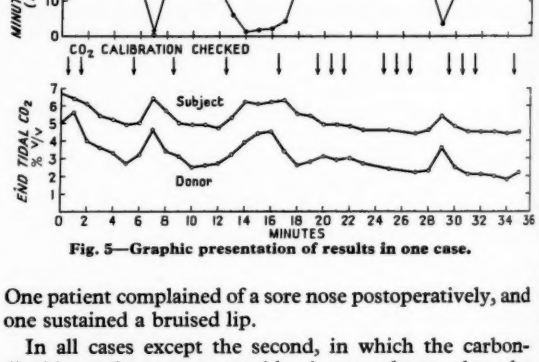

Fig. 5—Graphic presentation of results in one case.

One patient complained of a sore nose postoperatively, and one sustained a bruised lip.

In all cases except the second, in which the carbon-dioxide analyser gave trouble, it was shown that the patients' end-tidal carbon-dioxide concentration could be maintained below 5·6% with ease. The patients' (and donors') end-tidal carbon-dioxide concentration varied with the minute volume, the critical level of which appears to be in the region of 10 litres. Elam et al. (1958) pointed out that the donor must hyperventilate and suggested a minute volume of 10 litres on theoretical grounds.

The commonest symptom in the donor was tired hands from maintaining the airway and the mouthseal. The easiest way of doing so was for the donor to hold the patient's head extended with the chin up, using the hypothenar part of the palm and the fourth and fifth fingers of one hand. The thumb and second and third fingers of the same hand pressed the mouthseal to the patient's face. The nose was occluded with the other hand (fig. 7). Apart from tired hands the major factor limiting the time a donor could maintain expired-air resuscitation (excluding the length of the operative procedure) seemed to be boredom; there was certainly no general fatigue. Other symptoms in the donors included dizziness, but at no time was this sufficiently severe to cause them to give up resuscitation. It was not obviously correlated with any

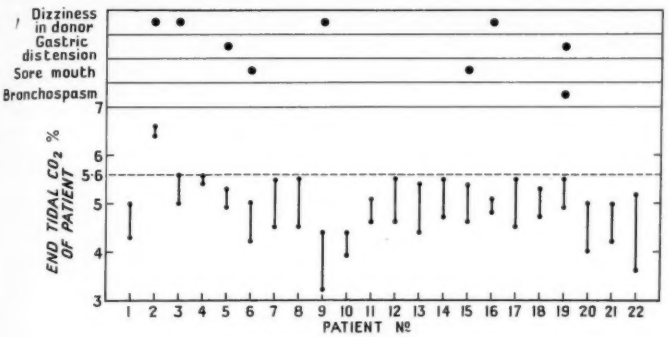

Fig. 6—Results in all cases.

definite levels of end-tidal carbon-dioxide concentration. Of the four donors whose end-tidal carbon-dioxide concentration fell below 2%, only one felt dizzy, and one other experienced tingling in the lips. On the other hand one donor felt dizzy with an end-tidal carbon-dioxide concentration of 2·75%. One donor complained of "popping" of her ears with each inflation. No other symptoms were recorded.

Discussion

The criticisms that have been levelled at expired-air resuscitation include the following: (1) æsthetic objections, (2) production of gastric distension, (3) possible lung rupture, (4) cross-infection between recipient and donor, (5) possible circulatory effects of intrathoracic positive pressure, (6) inadequate carbon-dioxide elimination in the subject, (7) hypocapnia in the donor.

Æsthetic Objections

We consider that these are considerable in mouth-to-mouth resuscitation, except possibly in the case of infants. For this reason we have adopted the mouth-to-airway method.

Gastric Distension

This, when it occurs, is of considerable importance in infants, in whom it may lead to a raised diaphragm and decreased venous return. Consequently in infants pressure should be maintained on the epigastrium with one hand during expired-air resuscitation. In adults, however, it does not seem to matter. With visible epigastric distension, Safar (1958) never found more than 1900 ml. of air in the stomach, and in these cases no alteration in the pulse-rate or blood-pressure was noted.

Morton and Mushin (1958) have shown that in anæsthetised and paralysed patients with an unobstructed airway, when the lungs are not held inflated, inflation pressures of 15 cm. of water or less cause no gastric distension. With peak pressures of 20–25 cm. of water, gastric distension occurred occasionally.

Lung Rupture

This is unlikely in adults unless the lungs are grossly diseased. Champneys (1887) found that in dead infants, to produce lung damage by inflation, a minimum of 20 mm. Hg was required. However, Emmert (1930) reported a fatal case of pneumothorax in a newborn infant following mouth-to-mouth resuscitation.

Infection

This is theoretically possible, and indeed Champneys (1887) recorded twelve cases of infants infected by a tuberculous midwife who practised mouth-to-mouth resuscitation. However, it is relatively unimportant when the method is being used in real emergency. When it is being taught on human subjects, a bacterial filter can be inserted if this is thought necessary.

Possible Circulatory Effects

We think that it is better to risk possible circulatory effects with a good tidal volume than to have no adverse circulatory effects from increased intrathoracic pressure and no tidal exchange.

Carbon-dioxide Levels

These are satisfactory in the subjects and tolerable in the donors.

Conclusions

In this study expired-air resuscitation was found to be easy and effective. We consider that the mouth-to-airway method is the one of choice as the æsthetic objections to mouth-to-mouth methods are great. Admittedly this introduces the need for some apparatus, but this is simpler and cheaper than any form of manually operated bellows. In addition a "double airway" has no moving parts or valves to deteriorate during storage—a particular risk in hot climates. The method was found to be easy to teach to untrained subjects.

Fig. 7—Method of holding airway.

Summary

Mouth-to-airway expired-air resuscitation was studied in twenty-two patients. Minute volumes achieved, and patients' and donors' end-tidal carbon-dioxide levels, were measured.

This is an effective method of resuscitation.

The method should take its place as an alternative to the standard methods, to which it is in some cases to be preferred.

We should like to thank the Medical Director-General of the Navy for permission for Surgeon Lieutenant-Commander Cox and Sick Berth Petty Officer Thomas to participate in this study; members of the staffs of the Middlesex and the Whittington Hospitals for their help and for allowing us to study patients under their care; and Mr. Dennis Hill and Dr. J. F. Nunn, who gave considerable help and advice throughout the study.

References overleaf

THE MUCOSA OF THE STOMACH AND SMALL INTESTINE IN IRON DEFICIENCY

ANNETTE RAWSON
M.B. Lond., M.R.C.P.
MEDICAL REGISTRAR

F. D. ROSENTHAL *
M.D. Lond., M.R.C.P.
SENIOR NEUROLOGICAL REGISTRAR

THE QUEEN ELIZABETH HOSPITAL, BIRMINGHAM, 15

DEGENERATIVE changes in the epithelial tissues of patients with iron-deficiency anæmia have long been recognised, and of these koilonychia, angular stomatitis, and glossitis are relieved by iron therapy. Hypochlorhydria or achlorhydria, with varying degrees of chronic gastritis and gastric atrophy, are common (Witts 1930, Davidson and Markson 1955). Davidson and Markson (1955) and Badenoch et al. (1957) regarded them as the result of iron deficiency; but Lees and Rosenthal (1958) found that, when this was corrected, the gastric mucosa did not improve, and concluded that the gastric lesions preceded and favoured its development.

There have been few reports on the appearance of the small-intestinal mucosa in iron deficiency (Doniach and Shiner 1957, Shiner 1958). We decided to ascertain whether there were any histological abnormalities of the mucosa of the upper small intestine, or any abnormalities of small-intestinal function. Any changes would, we thought, be of considerable interest, but the finding of normal mucosa in the small intestine would strengthen the view that iron deficiency is chiefly due to abnormalities in the gastric mucosa and its secretions.

Ten patients (see table) were selected on the following basis:

1. A fasting serum-iron level of less than 40 μg. per 100 ml.
2. Absence of demonstrable gastrointestinal ulceration or bleeding.
3. Freedom from disease known to be associated with disturbances in iron metabolism.
4. Correction of the anæmia by oral iron alone.

Biopsies

The small-intestinal mucosal specimens were obtained with a Shiner intestinal biopsy tube (Shiner 1956). At least four specimens were obtained from the small intestine proximal to the ligament of Treitz. When possible a gastric specimen was obtained at the same time, but in five cases the gastric biopsy was undertaken a few days later with a Wood's biopsy tube. Techniques were essentially as described by Shiner (1956) and by Wood et al. (1949). Specimens were fixed in formol-saline and sections were stained with hæmatoxylin and eosin. Terminology and analysis of the gastric mucosa is that of Lees and Rosenthal (1958) superficial and deep infiltration with inflammatory cells was classified as minimal, mild, moderate, or severe, while atrophy was graded as mild, moderate, severe, or complete.

Augmented Histamine Test-meal

A modification of Kay's method was used (Kay 1953). A radio-opaque Levine tube was passed under fluoroscopic control so that the tip lay along the greater curvature of the stomach at the level of the angulus. (It was found that advancing the tube further led to aspiration of duodenal contents.) Resting juice was collected by continuous suction for 45 minutes. 15 minutes after starting the aspiration 100 mg. mepyramine maleate was given by intramuscular injection. After collection of the resting juice, histamine acid phosphate 0·04 mg. per kg. body-weight was injected subcutaneously and the gastric juice was collected by continuous suction for 45 minutes. The volume of both specimens was measured, and the acidity determined by titration of 5 ml. aliquots against *N*/10 NaOH using Toepfer's reagent as the indicator.

Iron Tolerance Test

After an overnight fast, a specimen of blood for serum-iron estimation was obtained with an iron-free needle and iron-free glassware. Ferrous gluconate (1·0 g., containing 116 mg. elemental iron) as finely crushed tablets was given by mouth, and further specimens for serum-iron estimation were obtained 2 and 4 hours later. The serum-iron was estimated by an adaption of the *o*-phenanthraline method (Barkan and Walker 1940).

Serum Vitamin B_{12}

This was assayed with *Euglena gracilis* " Z strain ", by a modification of the Ross's (1952) method.

Other Investigations

These include fæcal fat excretion over a 5-day period, a glucose-tolerance test, and estimation of serum-proteins, serum-calcium, serum-phosphorus, and serum-alkaline-phosphatase.

Results

Biopsy of small intestine.—The histology was considered normal in all ten cases.

Biopsy of gastric mucosa.—None of the patients had a normal mucosa. All showed superficial infiltration (one minimal, two mild, two moderate, and five severe). Nine showed deep infiltration (two minimal, four mild, two moderate, and one severe). Atrophy was absent in one case and in eight cases it was moderate (see table).

Augmented histamine test-meal.—In eight cases no free acid was present in the resting juice; in one case a small amount was demonstrated; in one case secretion was within normal limits. After histamine stimulation, three cases had an achlorhydria; in five cases small amounts of acid were obtained, and in two cases acid secretion was normal (Kay 1953).

Iron tolerance test.—The maximum rise in serum-iron varied between 74 μg. and 417 μg. per 100 ml.

Serum vitamin B_{12}.—The serum levels of vitamin B_{12} were within the normal range, except in case 6, where the value was 70 μμg. per ml. (average of two separate estimations). On treatment of this patient with oral iron, the serum-B_{12} rose to 140 μμg. per ml. when the hæmoglobin reached 11·7 g. per 100 ml.

Other investigations.—No abnormality in fat excretion, glucose tolerance, or the level of serum-proteins, serum-calcium, serum-phosphorus, or serum-alkaline-phosphatase was demonstrated.

Although the presence of gastritis and gastric atrophy seemed to be reflected in the generally small amounts of acid obtained, the appearance of individual biopsies could not be correlated with acid secretion. Similarly, no close relation could be established between gastric mucosal appearances or acid secretion and serum-B_{12} levels.

* Present address: Leicester General Hospital, Leicester.

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FINDINGS IN THE TEN PATIENTS

Case	Age and sex	Hæmoglobin (g. per 100 ml.)		Augmented histamine test meal				Max. rise serum-iron (μg. per 100 ml.)	Serum vitamin B_{12} (μμg. per ml.)	Gastric mucosal findings			
		Before treatment	After treatment	Resting		After histamine				Infiltration		Atrophy	Histological diagnosis
				Vol. (ml.)	Acid (mEq.)	Vol. (ml.)	Acid (mEq.)			Superficial	Deep		
1	17 F	8·0	12·4	12	Nil	80	5·4	74	210	Mild	Minimal	Moderate	Moderate gastric atrophy
2	19 F	9·9	12·9	48	0·35	120	11·6	308	310	Severe	Moderate	Moderate	Severe chronic atrophic gastritis
3	20 F	7·6	12·9	42	Nil	73	3·1	201	320	Severe	..	..	Severe chronic superficial gastritis
4	35 F	6·1	13·4	16	Nil	7	Nil	..	160	Moderate	Mild	Moderate	Moderate chronic atrophic gastritis
5	35 M	11·1	14·9	9	Nil	17	0·4	129	190	Moderate	Mild	Moderate	Moderate chronic atrophic gastritis
6	37 F	9·1	12·0	98	3·0	158	15·9	417	70	Minimal	Minimal	Moderate	Moderate gastric atrophy
7	42 F	4·2	13·8	19	Nil	46	Nil	63	280	Severe	Severe	Moderate	Severe chronic atrophic gastritis
8	47 F	4·7	13·5	18	Nil	21	Nil	104	260	Mild	Mild	Moderate	Mild chronic atrophic gastritis
9	47 F	7·9	12·6	38	Nil	130	2·0	175	380	Severe	Mild	Nil	Severe chronic gastritis
10	49 F	10·1	11·6	39	Nil	91	4·9	189	410	Severe	Moderate	Moderate	Severe chronic atrophic gastritis

The mucosa of the small intestine was normal in all cases.

Discussion

Witts (1956) estimated that about 50 g. of gastrointestinal mucosa have to be replaced every day, and thought that an adequate supply of iron was required for this loss to be made good. Our findings show that the small intestine and its absorptive capacity remain unaffected, even though the mucosa of the body of the stomach may be highly abnormal. Such results were not unexpected, since absorption of inorganic iron, and of iron in food, is known to be increased in iron deficiency (Chodos et al. 1955).

The part played by abnormality of the gastric mucosa and its secretions in the development of iron deficiency is still controversial (*Lancet* 1958). The lesions have been shown by Davidson and Markson (1955) to be quite non-specific, though they are much commoner in patients with idiopathic hypochromic anæmia than in people without such anæmia. Except in one case reported by Badenoch et al. (1957), treatment with iron has not been found to improve the degree of atrophy or gastritis (Davidson and Markson 1955, Baldini and Cheli 1957, Lees and Rosenthal 1958). The gastric mucosal abnormalities seem to be responsible for the high incidence of hypochlorhydria and achlorhydria in iron deficiency; and in our patients the augmented histamine test-meals demonstrate that, even with maximal stimulation, there may be gross deficiencies in the production of hydrochloric acid. Badenoch et al. (1957) showed that production of pepsin and of intrinsic factor may also be considerably impaired, and in one of our cases the serum-B_{12} level was only 70 μμg. per ml.

The exact mechanisms by which abnormalities in the gastric mucosa and its secretions might affect the liberation of iron from food and its absorption remain obscure. That some gastric factor is at work is suggested by the fact that achlorhydria may precede iron deficiency by up to 20 years (Meulengracht 1932).

It is generally accepted that ferrous ions are more easily absorbed than ferric (Hahn et al. 1945) and that ascorbic acid reduces ferric to ferrous ions and prevents the oxidation of ferrous ions (Moore and Durbach 1951). This action of ascorbic acid and other reducing substances takes place more readily at low pH, and gastric hydrochloric acid could influence iron absorption in this way (Bergheim and Kirch 1949). Barer and Fowler (1937) held that absorption of small amounts of iron was reduced in the presence of achlorhydria, but neither they nor Moore (1955) were able to improve absorption by giving hydrochloric acid. Rosenthal et al. (1959) could not relate iron absorption, as measured by iron-tolerance tests, to changes in the gastric mucosa. Although in the small number of cases in the present series there were signs of a correlation between the maximum rise in serum-iron and the amount of acid secreted after maximum histamine stimulation, further investigations (unpublished) have not confirmed this.

However, if the abnormalities of the gastric mucosa and its secretions have a significant influence, this can only be one of several factors. Even in idiopathic hypochromic anæmia the gastric mucosa is not uncommonly normal (Davidson and Markson 1955, Badenoch et al. 1957). We excluded from our series any case with demonstrable gastrointestinal blood loss, but six of our nine female patients had menorrhagia and in seven of our patients the diet was considered to be iron-deficient. Hæmorrhage and an iron-deficient diet are recognised to be major factors in the development of iron deficiency. Gastric secretions can have no influence on the development of iron deficiency in persons with negative iron balance, but failure of these secretions may be important when food iron just suffices to correct iron loss.

Summary

1. In iron deficiency the mucosa of the small intestine, and its absorptive capacity, appear to be normal.

2. The normal small-intestinal mucosa and its absorptive capacity contrasts with the frequent finding of abnormalities of the gastric mucosa and its secretions.

3. The evidence that the gastric mucosal changes are not due to iron deficiency, and that gastric acid may influence iron absorption, is examined. The suggestion is made that gastric mucosal abnormalities may be important when intake of food iron is marginally adequate.

We wish to thank Prof. W. Melville Arnott and Dr. Gilbert S. Hall for kind permission to study patients under their care; Dr. J. N. Marshall Chalmers for hæmatological help and the estimation of vitamin-B_{12} levels; Dr. F. Neale for the serum-iron estimations; Dr. J. M. French for measuring the fat excretions; and Dr. W. T. Smith for reviewing the histological findings.

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CHLORAMBUCIL IN ERYTHRODERMIA

JOSEF LIBÁNSKÝ
M.D. Charles University
ASSISTANT PROFESSOR AND HEAD OF THE CLINICAL DEPARTMENT, INSTITUTE OF HÆMATOLOGY AND BLOOD TRANSFUSION, PRAGUE

JIŘÍ TRAPL
M.D. Charles University
ASSISTANT PROFESSOR, SECOND DERMATOLOGICAL CLINIC, CHARLES UNIVERSITY, PRAGUE

PRIMARY erythrodermia presents a difficult therapeutic problem. The relation of this disease to the hæmoblastoses has been known for some time but has rarely been taken into account in seeking the pathogenesis of erythrodermia, and only recently has the number of articles on this subject increased considerably. Erythrodermic manifestations are often encountered within the wide framework of the hæmoblastoses of the reticuloendothelial system—particularly in the reticuloses, and less frequently in mycosis fungoides and malignant lymphogranuloma (Degos and Ossipaski 1957). The term erythrodermia is sometimes used for the benign reversible reaction of the reticular tissue (the so-called lipomelanotic reticulosis of Pautrier-Worringer) or for a true proliferation with various degrees of differentiation. Erythrodermia thus comprises many different pictures, and evaluation in a given case may present clinical, pathogenetic, and prognostic difficulties. Together with skin manifestations there may be (1) involvement of the lymph-nodes (mainly inguinal and axillary) by a hyperplastic or tumorous process, (2) splenomegaly, (3) normal peripheral blood-smears, or (4) blood-smears showing a percentage of monocytoid cells of various differentiation or changes ranging from simple bone-marrow hyperplasia to infiltration by tumorous elements of reticuloendothelial origin.

The degree of inflammation of the skin varies, and the skin may be pigmented, irregularly infiltrated, dry, oozing, itching, or burning. The symptoms may disappear after some weeks, or they may last for months or even years, causing progressive cachexia; or the course of the disease may be rapid like that of the malignant reticuloses.

Until recently treatment has been symptomatic. The steroids seemed to offer hope, but they caused only temporary improvement and alleviation of the symptoms.

On the assumption that erythrodermias are associated with reticuloses, and especially when there were histological and cytological changes in the lymph-nodes, we tried chlorambucil (' Leukeran '), a modern cytostatic agent which had given good results in the treatment of malignant lymphomas. Because the effects were surprisingly good we decided to describe our results so far. Moreover, the response to chlorambucil throws light on the pathogenesis of " hyperplastic " erythrodermias by proving their close relation to hæmoblastoses of the reticular system.

The Investigation

Four patients were treated with chlorambucil. Before and during treatment they were examined in detail, including histology of the skin, full blood-counts and bone-marrow biopsy, cytology of lymph-node punctures, and histology of lymph-nodes, to assess the overall degree of involvement, and to obtain an accurate morphological classification.

Case 1.—In June, 1957, a tailor, aged 66, started to have violent itching, first of the legs and later of the whole body. Treatment with anti-histamines and vitamins gave no relief. His skin all became red gradually, with slight infiltration, much pigmentation, and persistent itching, and the axillary and inguinal lymph-nodes enlarged grossly, suggesting erythrodermia.

Examination revealed generalised enlargement of lymph-nodes up to the size of a plum, and slight splenomegaly; the liver reached 1 in. below the costal margin.

Laboratory Studies

The hæmoglobin content was 17·2 g. per 100 ml. and the erythrocyte-count was 5 million per c.mm. The white-cell count was 7700 per c.mm. (neutrophils 60%, eosinophils 19%, monocytes 5%, lymphocytes 16%), and in addition there were 1·5% leucoblasts of malignant appearance, the nuclei of which resembled reticular cells containing 1–2 nucleoli. The platelet-count was 160,000 per c.mm. The smear from bone-marrow aspiration showed mild eosinophilia and sporadic atypical reticuloendothelial-like cells, as in the blood itself.

The lymph-node punctate showed distinct proliferation of reticular cells without pronounced malignant changes. Histologically the skin presented the picture of reticulosis, with distinct tumorous elements, mitoses, and eosinophils. Around the vessels the infiltration reached deep into the corium and subcutis.

Plasma-protein electrophoresis revealed: albumin 48·6%, α_1-globulin 6·34%, α_2-globulin 11·98%, β-globulin 12·03%, γ-globulin 21·7%, and total albumin and globulin 9·4 g. per 100 ml.

Response to Therapy

In March, 1958, the patient was given chlorambucil 276 mg. (4·6 mg. per kg. body-weight) in the course of 4 weeks. During the following 3 weeks the redness of the skin gradually vanished, the itching ceased, and the skin regained its normal colour. Only the inguinal lymph-nodes remained enlarged, and these had become much smaller. The spleen was no longer palpable. The leucoblasts disappeared from the blood, and the eosinophil-count rapidly became normal. The remission after this single dose of chlorambucil has persisted for 24 months.

Case 2.—A man, aged 60, had had erythrodermia for 8 years. He had been treated with corticotrophin, cortisone, and anti-histamines, with only slight temporary improvement.

Before he was given chlorambucil his skin was a brownish-red colour, with slight desquamation. The lymph-nodes were generally enlarged to about the size of hazel nuts, but the spleen and liver were not palpable.

Laboratory Studies

On June 16, 1958, the hæmoglobin was 15·2 g. per 100 ml., the red-cell count 4,950,000 per c.mm., and the white-cell count 5800 per c.mm. (neutrophils 66%, eosinophils 8%, monocytes 6%, lymphocytes 20%). The platelet-count, erythrocyte-sedimentation rate, and bone-marrow-aspiration biopsy were within normal limits.

Lymph-node biopsy revealed proliferation of reticuloendothelial elements, but the morphological picture did not show clearly whether the reticulosis was benign or malignant. Histologically, however, the focal hyperplasia of reticuloendothelial elements resembled a malignant reticulosis, but there was also melanotic pigmentation in view of which the diagnosis of dermatopathic lymphadenitis (lipomelanotic reticulosis) could not be ruled out.

Plasma-protein electrophoresis showed: albumin 52·6%, α_1-globulin 3·18%, α_2-globulin 7·51%, β-globulin 8·43%, γ-globulin 27·1%, and total albumin and globulin 6·8 g. per 100 ml.

Response to Therapy

Treatment with chlorambucil was started in July, 1958, and the patient was given a total of 360 mg. (5·6 mg. per kg. body-weight) in the course of 4 weeks. The itching decreased during treatment and finally disappeared. The skin became pale, only slight redness persisting on the inner aspect of the thighs and on the scrotum. The axillary lymph-nodes became normal, and the inguinal and neck nodes diminished considerably in size.

After a remission lasting 7 months redness and desquamation

reappeared on the nape of the neck and the scrotum, and the inguinal lymph-nodes enlarged to the size of a plum. On July 4, 1959, the patient was again admitted to hospital for further treatment with chlorambucil. Within 2 weeks of treatment the itching ceased and most of the skin became pale. During the next month the improvement continued. There remained only slight desquamation on the inner side of the thighs, and slightly enlarged lymph-nodes.

After a remission of 3 months his condition deteriorated slightly. After a third course of chlorambucil, however, all the symptoms virtually disappeared.

Because of these two satisfactory results chlorambucil was given to a third patient with erythrodermia. Incomplete remission followed, which we attributed to an insufficient total dose of chlorambucil—the patient having left hospital prematurely. After 6 months another course of treatment was given (total dose 360 mg.; 4·8 mg. per kg. body-weight). The skin manifestations improved strikingly. As only a short time has elapsed since the end of the treatment this case cannot yet be finally evaluated. Chlorambucil was also given to a patient with mycosis fungoides, whose disease originally resembled erythrodermia and had lasted for 18 years. The improvement which resulted far surpassed any treatment (steroids, radiotherapy, &c.) he had had previously.

Discussion

Chlorambucil, p-(di-2-chloroethylamino)-phenylbutyric acid, synthesised by Everett et al. (1953) and introduced by Haddow (1952, 1953) for the treatment of neoplastic disease, has proved its worth in malignant lymphogranulomas, chronic lymphatic leukæmias, and some hæmoblastoses of the reticular system (Galton et al. 1955, Altman et al. 1956, Bérnard et al. 1956, Bouroncle et al. 1956, Ultmann et al. 1956). Our own experience (Libánský et al. 1957, 1959) has confirmed these findings. As far as we know, however, chlorambucil has not been tried previously in the treatment of erythrodermias when the skin manifestations overshadow the changes in lymph-nodes and other organs, or when the skin alone shows evidence of a disease process.

According to our concept erythrodermia always represents a proliferation of the reticuloendothelial system, even when it is not secondary to a hæmoblastic process involving the lymphopoietic tissue, as in Hodgkin's disease. We believe, therefore, that chlorambucil should be tried even in those cases where erythrodermia is the only clinical and pathomorphological manifestation. Chlorambucil was more effective than any other form of therapy (anti-histamines, steroids, vitamins, &c.) in patients who had been treated previously. Although the number of cases is small and our follow-up relatively short, we thought it desirable to report our results, for any means of alleviating such a chronic and highly irritating disease should be tried. Experience with more cases will show whether chlorambucil is a suitable drug for all forms of erythrodermia. In our patients chlorambucil was well tolerated and free from side-effects, but we suggest that patients having this drug should be under observation and their blood-counts should be checked weekly.

Summary

Treatment with chlorambucil (' Leukeran ') has been very effective in four patients with erythrodermia.

One patient with severe itching, infiltration, and pigmentation of the skin, gross enlargement of the lymph-nodes, and atypical elements in the blood, had a remission after a single dose of chlorambucil which lasted for 24 months.

Another patient had a remission for 7 months, after having chlorambucil, and a second course of treatment again gave good results.

In two other patients the effect of chlorambucil was very favourable, and superior to all other forms of treatment.

In view of our experience so far we recommend chlorambucil for the treatment of erythrodermias.

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Addendum

After completing this article we gave chlorambucil to another patient, 56 years old, who had very severe manifestations of erythrodermia with much pigmentation and generalised enlarged lymph-nodes. On histological examination a significant hyperplasia of reticuloendothelial elements was found. The leucocyte-count was raised to 16,000 per c.mm., with eosinophilia and single atypical monocytoid cells in the blood.

The symptoms had persisted for a year, and prednisone had given only slight and temporary improvement. Chlorambucil (total dose 350 mg.; 5 mg. per kg. body-weight, over 4 weeks) temporarily combined with prednisone caused marked improvement; the oozing ceased, and desquamation and itching diminished. The improvement continued for the next 2 months, leaving only slight redness and itching of the thighs. The remission has now lasted for 4 months.

Preliminary Communication

ANTIBIOTIC ACTIVITY OF HÆMOLYTIC ENTEROCOCCI

STRAINS of β-hæmolytic streptococci of many Lancefield groups produce antibiotic substances under appropriate conditions. The organisms shown to be sensitive to these antibiotics are mainly other streptococci.[1–3] This communication brings evidence that such inhibitory activity is a common characteristic of certain hæmolytic group-D streptococci and that it is effective against some intestinal anaerobes.

The cross-streaking method was used to study the interaction of 19 strains of group-D streptococci with typical examples of the organisms listed in the table. The group-D strains consisted of 3 National Collection of Type Cultures (N.C.T.C.) strains of *Streptococcus durans* (8129, 8174, 8307) and 16 strains of *Str. fæcalis* var. *zymogenes*: 2 of these were N.C.T.C. strains (5957, 8176), and the other 14 had been isolated from wound exudates and fæcal specimens. Apart from 8129 *Str. durans*, which was α-hæmolytic, all strains were β-hæmolytic on horse-blood agar.

The sensitivity of an organism was tested by first spreading it as shown in the figure, so that the growth density gradually diminished from one side to the other, and then cross-streaking this area with the streptococcus by a single stroke from the

1. Sherwood, N. P., Russell, Barbara E., Jay, A. R., Bowman, K. *J. inf. Dis.* 1949, **84**, 88.
2. Murray, R. G. E., Pearce, R. H. *Canad. J. Res.* 1949, **27E**, 254.
3. Murray, R. G. E., Loeb, L. J. *ibid.* 1950, **28E**, 177.

ORGANISMS INHIBITED BY 3 HÆMOLYTIC ENTEROCOCCI

Organisms tested	No. of strains tested	No. of test strains inhibited by: 8176 *Str. faecalis* var. *zymogenes*	5957 *Str. faecalis* var. *zymogenes*	8174 *Str. durans*
Staphylococcus aureus	12	0	0	0
Streptococcus pyogenes	14	6	4	1
„ *pneumoniæ*	7	7	7	7
Hæmophilus influenzæ	3	0	0	0
Escherichia coli	6	0	0	0
Proteus vulgaris	3	0	0	0
Pseudomonas pyocyanea	3	0	0	0
Clostridium œdematiens	1	1	1	1
„ *welchii*	14*	14	14	14
„ *septicum*	1	1	1	1
„ *tetani*	2	0	0	0
„ *bifermentans*	1	0	0	0

* These included 1 strain of types A–F, 1 heat-resistant strain, and 7 untyped strains of human origin.
The facultative anaerobes were tested both aerobically and anaerobically.

denser side. The plate was incubated immediately thereafter at 37°C and read for inhibition thirty-six to forty-eight hours later.

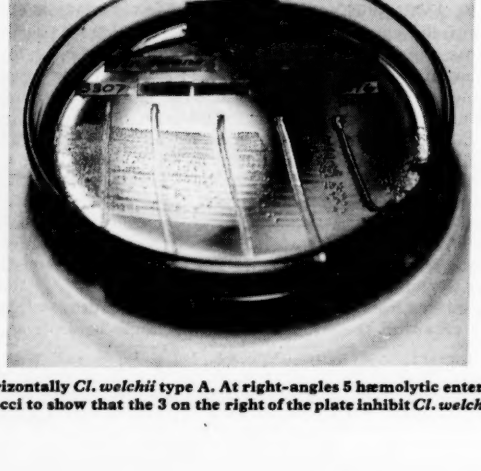
The figure shows a strain of *Clostridium welchii* type A spread in this manner and cross-streaked with the five N.C.T.C. strains. This plate showed that the two hæmolytic *Str. faecalis* strains and 8174 *Str. durans* were active in producing inhibition. Organisms sensitive to these strains are listed in the table.

Active filtrates were prepared by growing either of the 2 *Str. faecalis* strains for forty-eight hours at room temperature in 20% serum meat-extract broth. The cell-free filtrates, when placed in wells made in the plates, inhibited the same range of organisms as the enterococci themselves. Controls of the same pH values did not cause inhibition. The inhibitory activity was still detectable at least seven days later if the filtrates were kept at 4°C. The inhibitory activity was heat-labile (destroyed by an hour at 60°C). Both the organisms and the filtrates produced inhibition on ordinary meat-extract agar and on catalase-rich media such as horse-blood and heated-blood agar. 10% hydrogen peroxide controls in the wells produced inhibition on the ordinary agar medium but effervesced and were inactive on the catalase-rich media. The filtrates did not effervesce on the catalase-rich media and any hydrogen peroxide present must have been small in amount and easily inactivated.

The further 14 strains of *Str. faecalis* var. *zymogenes* were tested against a selection of the sensitive and insensitive aerobes and anaerobes listed in the table, and their inhibitory activity in all cases corresponded with that of the N.C.T.C. strains.

The main interest of these observations lies in the inhibitory effect of the enterococci upon *Cl. welchii*. Smith [4] mentions this inhibitory effect as a possible reason for failure to grow *Cl. welchii* in attempts to isolate the anaerobe from mixed cultures containing enterococci. Guelin, Kreguer, and Le Bris [5] also reported the inhibitory action of a particular enterococcus upon a type-A *Cl. welchii*. As no other references were traced in a long search of the available literature, it may be concluded that the inhibitory effect of some enterococci on *Cl. welchii* has not only received little attention but is not perhaps very widely known.

4. Smith, L. DS. Introduction to the Pathogenic Anaerobes; p. 61. Chicago, 1954.



Horizontally *Cl. welchii* type A. At right-angles 5 hæmolytic enterococci to show that the 3 on the right of the plate inhibit *Cl. welchii*.

The effect is not explained by pH change. The evidence is against its being due to hydrogen peroxide, because it is produced under anaerobic conditions on media rich enough in catalase to inactivate relatively large quantities of hydrogen peroxide. Whether or not some property of nascent hydrogen peroxide could bring about this effect might be arguable, but such a hypothesis would not explain the activity of the filtrates or the lack of inhibition of such an oxygen-sensitive organism as *Cl. tetani*.

This inhibitory effect seems worth a preliminary report because the consistency of the activity against *Cl. welchii* has probably not been appreciated and might possibly be of practical value. Apart from the usefulness that such an agent might have in preparation for operations on the large bowel, it might have a place in prevention or treatment of the common clostridial enterotoxæmias of domestic farm animals. For this reason it is proposed to study this antibiotic effect further.

I am grateful to the Curator of the National Collection for the provision of many of the strains used. I am also indebted to Mr. George Kerr for the accompanying photograph.

Bacteriology Department, University and Western Infirmary, Glasgow

J. M. STARK
M.B. Glasg.

Medical Societies

MANCHESTER MEDICAL SOCIETY

AT a meeting of the Section of General Practice on Feb. 22 Pitfalls in the Diagnosis and Management of Blood Diseases were discussed by Dr. M. C. G. ISRAËLS.

Dr. Israëls said that in the first place it is necessary to establish whether anæmia is present, and this is best done by estimating the hæmoglobin or having a blood-count done. It may be impracticable to deal with all patients this way, and it is usually safe to treat females with oral iron for one month and send them for a blood-count if there has been no response. Males with anæmia should never be treated without investigations. It is most important to use only simple iron preparations, such as ferrous sulphate or gluconate, and never to use compound hæmatinics.

When a blood-count is available, the course of action in general practice may often be determined by the colour-index, but all patients with a hæmoglobin level of less than 40% are best sent to hospital without delay for further investigation—particularly patients with anæmia and a polymorph leucocytosis, since this often indicates some malignant factor. If the colour-index is less than 1, women under 50 can be treated with oral iron for one month; but males of any age, women over 50, and girls under 16 should be further investigated before treatment. When the colour-index is about 1, women again often prove to have simple iron deficiency. But there are two other anæmias with this sort of picture: anæmia due to renal failure and aleukæmic leukæmia; these can be detected only by full hæmatological studies. When the

5. Guelin, A., Kreguer, A., Le Bris, J. *Ann. Inst. Past.* 1947, **73**, 1036.

colour-index is over 1 there is a great temptation to diagnose pernicious anæmia and to give treatment without further investigation; but this is a dangerous and bad practice, for there are several other causes of such a blood picture. These include acute leukæmia, acquired hæmolytic anæmia, steatorrhœa, and aplastic anæmia. The management of these conditions differed widely. Consequently such patients should be sent to hospital for investigation and never be given cyanocobalamin (vitamin B_{12}) while waiting to be seen; ill patients should be seen within twenty-four hours at any properly organised hospital.

Reviews of Books

Metabolic Care of the Surgical Patient

FRANCIS D. MOORE, M.D., Moseley professor of surgery, Harvard Medical School; surgeon-in-chief, Peter Bent Brigham Hospital, Boston. Philadelphia and London: W. B. Saunders. 1959. Pp. 1011. 140*s*.

IN modern surgical practice the study and care of the metabolic aspects of disease becomes increasingly important. No one person has more significantly influenced this alteration in surgical outlook than Dr. Francis Moore, who has here set out the accumulated knowledge and wisdom from his many years of study of surgical metabolic problems. As he says in an introduction, his purpose is " to provide a general text and guidebook for metabolic care in surgery ", and indeed the book covers in great detail practically every aspect of this vast subject.

Divided into six sections, it starts with a consideration of the normal patient, and the normal metabolic changes after operation and during convalescence. The remaining sections deal with changes in blood-volume; body-fluid and electrolyte disturbances; loss of body substance; visceral disease in surgical patients; and fractures, wounds, and burns. In these last two sections the emphasis is naturally on the metabolic changes, though general surgical management is also discussed in some detail.

In each section the problems are dealt with in the utmost detail and from all possible angles, so that the volume is a storehouse of information. To those uninitiated in this type of surgical care the mass of intricate information and argument may at times seem daunting, but the book is not intended as a primer, and those who have already mastered the rudiments of the subject will find in it much of interest and value. It is a pity that the style is sometimes obscure; and the length of the text is increased by the author's plan of discussing each subject and then adding a separate chapter on the relevant literature, in which much of the information already imparted is set out again with references.

The book is profusely illustrated with metabolic charts showing the various changes described, as well as many diagrams, some simple but many complex, representing various physiological and metabolic processes. Thus there are nine diagrams illustrating the circulatory changes in shock, many of them with captions of over half a page in small print. The aim of such illustrations is to drive home some important fact or concept, and it is doubtful whether the more complicated charts serve this purpose. The main text is also illustrated by case-histories in which the development and management of actual metabolic disturbances is very usefully discussed. The book is well produced with a good index and a very full bibliography.

It is hard to believe that many surgeons will read all this long book, but at the same time it is even harder to believe that there are any surgeons who will not find much in it to interest and stimulate them. To the expert in this branch of surgical studies the book will be invaluable as a source of information and reference. For the undergraduate reader it is undoubtedly too detailed for standard use, but many, by judicious " dipping ", might well have their minds opened to concepts of surgical thought and care of which they might otherwise be unaware. Dr. Moore's great work is a very valuable addition to surgical literature.

Physiology of the Retina and Visual Pathway

Monographs of the Physiological Society, no. 6. G. S. BRINDLEY, M.A., M.D., fellow of King's College and lecturer in physiology, University of Cambridge. London: Edward Arnold. 1960. Pp. 298. 35*s*.

THIS instructive book was obviously written because its author had done a great deal of penetrating thinking and sound experimental work on the topics he discusses. It deals with photochemistry, electrical activity in the retina, central visual pathways, subjective experiments, spatial, temporal, and adaptational effects on the threshold, and colour-vision. Consequently it cuts into carefully selected parts of a highly intricate subject. But for whom was it written? The neurologist will dislike the unexplained substitution of " extinction " for " optical density ", and he will not share the author's apparent amazement that the optic nerve should contain a large proportion of fibres not relaying in the lateral geniculate body. The histologist will be surprised that Søjstrand's criticism of De Robertis' work is not mentioned. The photochemist may wonder why absorption spectra (extinction or optical density?) of the same substances are " not quite the same " for a solution and in situ respectively (p. 22) but " extremely similar " on p. 23. Yet the reader for whom the book is intended, presumably one already acquainted with more than the third-year or primary F.R.C.S. account of visual physiology—in short, an expert—will like it. For some lack of balance in treatment is more than compensated by the original thought which Dr. Brindley has bestowed on the material. The worker in this subject will also be inspired to do quite a number of new experiments, and will have learnt both how to correlate various results and, if he is wise, how not to do it. In short, he will benefit by reading this book.

Postvaccinial Perivenous Encephalitis

ERNST DE VRIES, emeritus professor of neurology and neuropathology, and neuropathologist, neurological clinic, University of Utrecht, The Netherlands. Amsterdam: Elsevier Publishing Company. London: D. Van Nostrand. 1960. Pp. 181. 38*s*.

THE author has made a study of the pathological changes in the brains of most of the cases of postvaccinial encephalitis which have occurred in Holland since 1925. From the 62 cases which he has collected he separates a group of 29; these show a pathological picture described as a perivenous microglial type of encephalitis, with focal demyelination. The clinical condition usually arises after vaccination against smallpox—i.e., infection with live vaccinia virus—and much more rarely after measles, rubella, or varicella; and Professor de Vries considers that a firm diagnosis of this particular variety of encephalitis can be made only after histological examination of the nervous system.

The description of the pathological changes is useful, but the illustrations are not always adequate. A moderate amount of space is devoted to clinical descriptions of the cases, and the literature on postvaccinial encephalitis is discussed fairly briefly.

The book will interest neurologists and neuropathologists since it presents both clinically and pathologically an interesting series of cases of a rare condition; but it cannot be said to throw much light on the fundamental problems of encephalitis or demyelination.

Care of the Dying

CICELY SAUNDERS, M.B. *Nursing Times* Reprint. London: Macmillan. 1959. Pp. 32. 2*s*.

THE care of the dying and the clinical, emotional, and spiritual aspects of death are passed by in the medical curriculum, and little taught to students or even to housemen in the wards of teaching hospitals. It is probably as easy now as it was 40 years ago to go into practice consciously and lament-

ably ignorant of all these matters and with a strong tendency to leave them to nurses or even to relations. Into this little booklet Dr. Saunders has poured an astonishing amount of informed instruction, advice, and recorded observation. She has been in turn nurse, almoner, and, it seems, medical superintendent of " terminal care " hospitals, and she writes with well-earned authority. She early makes it clear that she writes also as an Anglican Christian, believing that " by Man came death ", but any medical reader who quits at this point because he cannot accept this doctrine will lose a great deal of very practical instruction in devices for the relief of pain and distress and the skilful use of drugs. The booklet deserves to be very widely read and might well be expanded into something larger.

Carcinogenesis of Ultraviolet Light

HAROLD F. BLUM, physiologist with the National Cancer Institute, and visiting professor of biology, Princeton University. Princeton: Princeton University Press. London: Oxford University Press. 1959. Pp. 340. 52*s*.

THIS book explores, in lively and evocative language, the process by which ultraviolet light induces cancer. The earlier chapters deal with the various effects of ultraviolet radiation on biological systems, and though they are preparatory to the main part of the work—the construction of a model for this system of cancer formation from quantitation of the (considerable) experimental data—they are very interesting in themselves.

In Dr. Blum's model, the tumour is shown to grow with regularly repeated dosage, by the proliferation of an increasing number of clones of cells, the proliferation of which is constantly accelerated. This increase in rate of proliferation (which is inherited) is best explained on the basis of quantitative increase in some replicated pattern (carried by nucleic-acid templates or " tems ") within the cells. Thus the cancer cell can be held to differ from the normal only in containing a greater number of " tems ", which may accumulate within the cell in a variety of ways. The acquisition of " tems " by a cell results in its neoplastic transformation.

The " tem " hypothesis which the author extends to other cancer systems is an extrapolation, and Dr. Blum is at pains to distinguish it from the quantitative bedrock of data which showed the process of cancer formation by ultraviolet light as continuous, cumulative, essentially irreversible, and non-threshold. As for the latter, it would be exceedingly difficult to derive a more cogent interpretation of the data. The speculations arising from the extrapolation seem less convincing in that little or no consideration is given to the specificity of action of carcinogenic agents. Taking Dr. Blum's hypothesis to its logical conclusion, all that is required is the chronic application of some minimal trauma.

British Encyclopædia of Medical Practice (*Cumulative Supplement, 1959. Medical Progress, 1959.* London: Butterworth. 1959. Pp. 445. 35*s*. Pp. 325. 37*s*. 6*d*.; combined price 67*s*. 6*d*.).—The first of these two volumes is essential for those who own the *Encyclopædia* and wish to keep it up to date. It consists of additions and emendations to articles already in the *Encyclopædia* and is therefore of interest only to those who have the other volumes. *Medical Progress*, though printed and bound uniform with the *Encyclopædia*, can well stand by itself. It contains a series of critical surveys of various aspects of medicine and surgery, and includes a special section on therapeutics and new drugs. There is also a short section devoted to abstracts of important papers, ranging from acidosis to whooping-cough. The *Encyclopædia* is a well-established favourite; and these volumes, produced under the editorship of Lord Cohen of Birkenhead, maintain a high standard. The only distinct gap is that there is too little about the problems of old age, and perhaps the 1960 edition might include a survey of developments in geriatrics.

New Inventions

A SIMPLE BED CRADLE

AFTER a few days in bed the weight of bedclothes on the feet becomes uncomfortable, predisposes to pressure-sores of the heels, encourages foot-drop, and disturbs tone in the leg muscles (which I suspect makes them weaken quickly).

Bed cradles of semicircular design are unsatisfactory because patients often knock their shins on them, even when they are padded. Also they are expensive. Other bed cradles tend to take up too much of the bedclothes for comfort, are awkward to manipulate, and are more expensive.

A simple bed cradle can be made from an 8-ft. length of $\frac{1}{4}$ in. mild steel rod. The stages are illustrated in fig. 1. Apart from welding the two ends together at stage 3 no special skill is required.

In most cases one cradle only is needed at the bottom of the bed (fig. 2). Other patients require one on either side of the mattress to keep the bedclothes well clear of the limbs (fig. 3). Occasionally three cradles—at the bottom and at either side of the mattress—are necessary.

Though greeted with little enthusiasm, these bed cradles soon became popular with the nursing staff of the geriatric ward at Shenley Hospital, St. Albans. They are light to carry, easy to manipulate, and simple to store. They can be manufactured as an occupational-therapy project. The cost of the raw materials is about 1*s*. 4*d*.

Acknowledgments are due to the engineers at Shenley Hospital, who made the prototype; to Miss Shirley Ogden, under whose ægis many more cradles were made in the occupational-therapy department; and to Miss H. M. Collins, who took the photographs.

RUSSELL BARTON
M.B. Lond., M.R.C.P., D.P.M.
Severalls Hospital, Colchester, Essex

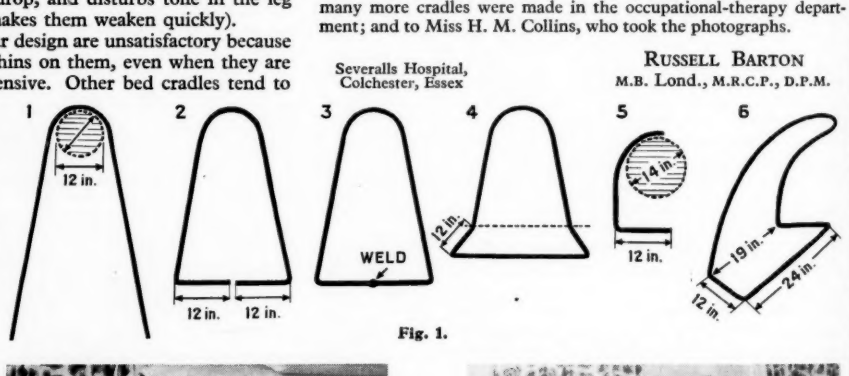


Fig. 1.

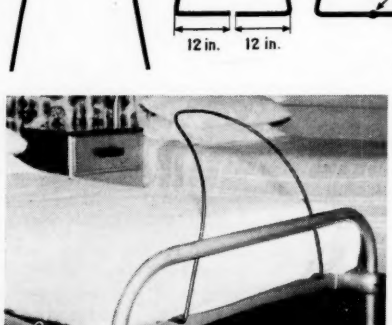


Fig. 2.

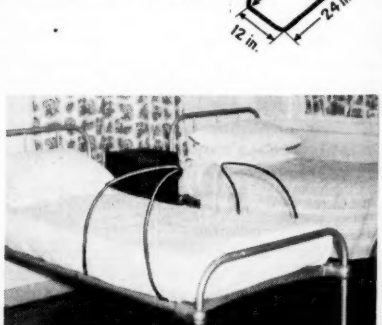


Fig. 3.

THE LANCET

LONDON 2 APRIL 1960

Expired-air Resuscitation

METHODS of artificial respiration have to be tested by doctors but applied by laymen—a fact which should be borne in mind when their merits are discussed. Expired-air resuscitation has aroused considerable interest in the past few years, and a realistic appraisal of its value is required. Such an appraisal is not easily arranged. Ideally, it calls for the bringing together of a patient with acute respiratory failure and a rescuer without medical training, in the circumstances of real life. (These may include emotion, vacillation, conflicting advice from bystanders, storm and tempest, unsuitable clothing, weeds in the windpipe, and mud in the mouth.) Such circumstances preclude objective measurement. Scientific assessment can be made only in the relative calm of a medical establishment, and must inevitably be unrealistic. No normal volunteer, however cooperative, can imitate the behaviour of a patient with acute respiratory failure. To induce such failure the respiratory muscles must be paralysed by one of the relaxant drugs, and few subjects are so phlegmatic that they will endure this while remaining conscious. Assessment must therefore be made on anæsthetised paralysed subjects (who must be properly looked after) with the help of equipment designed to measure the efficacy of the artificial respiration. Several such studies have, in fact, been undertaken [1-3]; and this issue includes the results of a trial by Lieut.-Commander COX, Professor WOOLMER, and Petty Officer THOMAS.

These studies leave no doubt that expired-air artificial respiration, in the circumstances of the investigations, is an effective method, superior in some respects to all others available to laymen. Mechanically the chest can be compared to a bellows, but it lacks the handles by which the sides of the bellows can be drawn apart. This lack accounts for our relative inability to *pull* the chest open—a difficulty which can be effectively countered only by such elaborate devices as the cabinet respirator —and gives the advantage to methods of *pushing* it open by positive pressure applied to the inside. The positive method has the additional merit that a means of producing the required airflow is at hand in the respiratory apparatus of the rescuer—an apparatus well suited to this purpose and with an ample reserve of power. It is not surprising, therefore, that expired-air resuscitation can ventilate the lungs, in ideal conditions, better than any of the manual methods. "Ideal conditions" implies an unobstructed airway in the patient, and a gastight connection between the airways of the patient and the rescuer. An unobstructed airway is of course essential with any method: it can more easily be obtained with expired-air resuscitation because the hands of the operator are free to support the jaw and extend the head. The requirement of a gastight fit is peculiar to the positive method, and difficulty in attaining this is one of its disadvantages.

This difficulty is least if the mouth of the rescuer is applied directly to that of the patient, but the æsthetic objections to this practice are formidable. The interposition of a tube gets over the æsthetic objections but at the price of two other disadvantages: the need for a piece of equipment, and the possibility of misusing it.

By a modification of this method an open airway is assured by tilting the patient's head back as far as it will go, and blowing into his nose.[4,5] This is less objectionable than mouth-to-mouth contact, and avoids the necessity for putting anything into the patient's mouth; and it has been found effective by several independent workers. Moreover, it can be applied with the patient in the semi-lateral position, from which his head can easily be turned to promote drainage from the pharynx.

The positive method is open to the further objection that it impairs the venous return by increasing the mean intrathoracic pressure.[6] A healthy cardiovascular system can easily overcome this disadvantage, but a seriously anoxic one may not. It is difficult to say how important this effect may prove in practice—and of course manual methods involving compression of the chest are not free from the same objection.

How serious are these disadvantages? Inability to maintain a gastight seal is not a serious drawback. An average-size rescuer can easily deliver a litre of air per breath, and comfortably exceed twelve breaths of this volume per minute; so losses by leakage of the order of 30% can be accepted. The need for a tube to avoid the direct application of the rescuer's mouth to that of the patient is a serious disadvantage so far as the general public is concerned. For organised bodies, such as the Armed Forces, fire brigades, police, beach guards, and mine rescue teams, the disadvantage is slight; for the tube is small and inexpensive.[3,7] The possibility of a properly designed tube injuring the patient is remote. The importance of draining the lungs is often exaggerated; and of course acute respiratory failure is not always the result of immersion or of poisoning by anticholinesterases. If there is a pulmonary circulation, water is quickly absorbed into it from the lungs. If there is not, artificial respiration is probably useless anyway. The possibility that fluid regurgitated from the stomach may be blown into the respiratory tract is more disturbing; but regurgitation is much likelier to result from compression of the trunk, which is a part of the manual method, than from expired-air resuscitation.

What is peculiar to expired-air resuscitation is that it cannot be taught by practice on conscious volunteers, because of æsthetic objections. This does not mean that it cannot be taught at all. On the contrary there is good evidence that it can be taught quite easily. In a

1. Gordon, A. S., Frye, C. W., Gittelson, L., Sadove, M. S., Beattie, E. J. *J. Amer. med. Ass.* 1958, **167**, 320.
2. Elam, J. O., Brown, E. S., Elder, J. D. *New Engl. J. Med.* 1954, **250**, 749.
3. Safar, P. *J. Amer. med Ass.* 1958, **167**, 335.
4. Elam, J. O., Greene, D. G., Schneider, M. A., Ruben, H. M., Gordon, A. S., Hustead, R. F., Benson, D. W., Clements, J. A., Ruben, A. *ibid.* 1960, **172**, 812.
5. Buchanan, L. *Med. J. Aust.* 1960, i, 406.
6. Whittenberger, J. L. *Physiol. Rev.* 1955, **35**, 611.
7. Dobkin, A. B. *Lancet*, 1959, ii, 662.

recent study in the U.S.A. all of 87 untrained rescuers were able to insert an airway and produce satisfactory ventilation after one demonstration.[8] Teaching films have been made in North America and Denmark, and copies of at least one [9] of them may be had in this country. Working models, or mannikins, are being made in the U.S.A., in Canada, and in Denmark, and can also be obtained here. They give a sufficiently life-like impression of the human respiratory tract for demonstration of the method, and of the mechanism of airway obstruction and how to avoid it. Nevertheless, the need for such aids may prove an insurmountable obstacle to those who teach respiratory resuscitation as a part of first-aid classes for the general public; for much of this teaching takes place in schools and youth clubs which lack the necessary resources.

This method has been adopted by the U.S. Army and Navy and recommended by the American Red Cross as that of choice when the patient is a child. Reports of the use of expired-air resuscitation " in earnest " are still too few to warrant conclusions, and anyhow one can never be sure that a patient who has been resuscitated by one method would not have responded equally well to another. The experimental evidence of the efficiency of expired-air resuscitation is, however, so strong that it should be accepted as an alternative to the established methods in most circumstances, and as superior to them in some—for instance, when the patient has chest wounds or when the rescuer must work in a confined space. Acute respiratory failure may be a transient disorder, quickly fatal if untreated but often completely reversible without sequelæ by prompt and effective action. Doctors and first-aid workers should be prepared.

Precancerous Lesions of the Vulva

EVER since the original work of BERKELEY and BONNEY,[10] leucoplakia of the vulva has been regarded as the most important factor in the causation of vulval carcinoma. Unfortunately there is disagreement—in particular between gynæcologists and dermatologists—about the precise lesion to which the term " leucoplakia " should properly be applied.

To the gynæcologist leucoplakia is a disease which may arise in hypertrophic or in atrophic form, and may affect part or all of the vulva except the vestibule and the urethral orifice, and may even extend laterally to the folds of the thighs and backwards to surround the anus. The affected skin has a whitish, sodden, or parchment-like appearance, with cracks and fissures which are largely the result of scratching caused by the intense pruritus. In the hypertrophic phase the microscopic appearances are of epithelial overactivity with severe hyperkeratosis and thickening of the epidermis, the rete pegs dipping downwards in a pointed form into the dermis, which shows absence of elastic tissue, hyaline degeneration of the collagen, and round-cell infiltration; it is in this stage that the risk of malignancy is thought to be greatest. The disease may later pass into an atrophic form with similar dermal changes, but with atrophy of the epidermis and flattening or disappearance of the rete pegs, although considerable hyperkeratosis remains; the precise relation between this atrophic phase and the development of carcinoma is seldom clear. In the view of BERKELEY and BONNEY [10] the disease at this stage is quiescent, pruritus has ceased, and the patient does not complain. TAUSSIG,[11] however, doubted whether a final phase of complete inactivity exists; and certainly intense pruritus commonly persists when the skin shows this atrophic appearance.

The dermatologist's view [12 13] is somewhat different. The condition described by gynæcologists as the atrophic phase of leucoplakia they term lichen sclerosus because of the great similarity, both macroscopically and microscopically, between the vulval lesion and other lesions of lichen sclerosus, which may be found elsewhere on the body. The term leucoplakia they confine to whitish patches similar to those of lichen sclerosus, but with more induration, which are limited sharply to the vulval area and do not extend beyond the outer margin of the labia majora or into the perianal region. The microscopic appearance is that of the hypertrophic phase already described.

If we accept this view, which seems to have more to commend it, and if we employ this terminology, are we to regard the chronic whitish irritating vulval lesion as precancerous? In a group of cases with vulval soreness or pruritus, WALLACE and WHIMSTER [12] found 20 patients with lichen sclerosus, in all but 2 of whom perianal skin was also involved, and in 6 of whom lesions were present elsewhere, notably on the trunk and breasts; careful follow-up of these cases with frequent biopsy showed the changes of leucoplakia in 5, in 2 of whom the lesion subsequently progressed to carcinoma —in short, the gynæcological order was reversed. In the same series WALLACE and WHIMSTER found that leucoplakia was not necessarily preceded by lichen sclerosus, for in 5 cases the leucoplakia was superimposed on severe atrophic change (described as primary vulval atrophy), while in 21 cases of leucoplakia no other vulval disease was found. Similar findings are reported by STENING and ELLIOTT.[14] Examination of a group of patients with chronic vulval lesions, but without obvious cancer, showed the changes of lichen sclerosus alone, the changes of leucoplakia alone, or both groups of changes together in three-quarters of the cases remaining after other obvious lesions had been excluded. In both series the microscopic appearances of leucoplakia were not found outside the lateral margin of the labia majora, in the perianal region, or in the folds of the groin. In STENING and ELLIOTT's series, of 52 patients with carcinoma of the vulva nearly two-thirds were found to have pre-existing leucoplakia, while in only a fifth had the carcinoma not been preceded by other disease.

Since leucoplakia may arise de novo or be preceded

8. Safar, P., McMahon, M. *J. Amer. med. Ass.* 1958, **166**, 1459.
9. Brook, M. H., Brook, J. *Canad. med. Ass. J.* 1960, **82**, 245.
10. Berkeley, C., Bonney, V. *Proc. R. Soc. Med.* 1910, p. 29.
11. Taussig, F. J. Diseases of the Vulva. New York, 1921.
12. Wallace, H. J., Whimster, I. W. *Brit. J. Derm.* 1951, **63**, 241.
13. Vickers, H. R., Sneddon, I. B. *in* Modern Trends in Geriatrics (edited by W. Hobson); p. 184. London, 1957.
14. Stening, M., Elliott, P. *J. Obstet. Gynæc. Brit. Emp.* 1959, **66**, 897.

by such chronic lesions as vulval atrophy or lichen sclerosus, and since lichen sclerosus at least is not precancerous in other situations, even as near as the perianal region, the main factor in vulval carcinoma is perhaps the liability of the sexual skin to undergo malignant change. JEFFCOATE [15] believes that any chronic skin disease or irritation of the vulva may lead to carcinoma in a susceptible woman. In any one case, only biopsy will show whether epithelial overactivity exists; so in any patient with pruritus and a suspicious lesion biopsy specimens from several sites on the vulva should be obtained. If the changes are found to be those of lichen sclerosus and the patient can be kept under careful observation for a considerable time, further surgical treatment, except biopsies, may not be required. The appearance of leucoplakic changes, however, is an indication for local vulvectomy. If the leucoplakia has arisen de novo the patient may be cured; if it is superimposed on lichen sclerosus the removal of the skin with the special precancerous tendency has been achieved, even if other areas of lichen sclerosus in the perineum or on the nearby skin give trouble later.

Epidemiology of Influenza

INFLUENZA is the rogue among epidemic diseases, suddenly cutting loose and sweeping across the world with a speed and a ferocity unequalled by any other disease. The great advances in our acquaintance with the causal viruses since the first was discovered by SMITH, ANDREWES, and LAIDLAW [16] in 1933 have not been paralleled by an equivalent understanding of the epidemiology.

The mechanism of an epidemic of measles or smallpox is now well understood, but epidemics of influenza cannot yet be interpreted by applying the same methods. WATSON [17] has taken these difficulties as the starting-point of an unusual and detailed research among 176 families in his rural general practice. The occurrence of Asian influenza in late 1957 presented the opportunity to observe the progress of the epidemic until it died out in the third and fourth months of 1958. HOPE-SIMPSON and SUTHERLAND,[18] studying the 1951 epidemic of virus-A influenza, had been unable to show unequivocally that the virus spread within the household or to determine a regular serial interval, which is a measure of the host-parasite cycle. WATSON presents evidence that the Asian virus was in fact spreading within the household, that inapparent infections were occurring, and that house contacts of persons known to be infected with the Asian virus did escape the infection. He considers that his evidence points to a constant incubation period, most commonly of two days, and to a serial interval varying from one to ten days but usually of three days. He describes other evidence suggesting that the most infectious time is that of the temperature peak, and that the virus is spread by coughing. Many of WATSON's patients had a diphasic (M-type) temperature chart and he suggests that the second rise of temperature is due to reinfection of the patient's own respiratory tract by the virus released during the first bout of fever, the incubation period of the second rise being again two days as in the primary attack caught from another person. These patients probably had two periods of infectiousness, one each time the temperature rose to a peak.

WATSON's own blood, tested at fortnightly intervals, showed no response for the first six weeks during which he was in constant attendance on cases of influenza. Subsequently, a rise of complement-fixing antibody against influenza-virus A followed closely on the occurrence of cases of influenza in his family although he himself did not fall ill. The blood of his assistant showed a similar picture, although no influenza occurred in his household either before or after his symptomless rise in antibody titre.

Even the most attentive and knowledgeable general practitioner cannot eliminate the possibility of paths of infection by which his patients may, unknown to him, have received doses of the virus. WATSON's work is a remarkable piece of research of a type for which the general practitioner has an almost unique opportunity but can seldom find the necessary equipment of persistence, enthusiasm, keen observation, and an inquiring and closely reasoning mind.

The Asian influenza epidemic is described from a different viewpoint by the Ministry of Health,[19] which has brought together information from general practice, hospital practice, public-health departments, insurance offices, schools, colleges, camps, and laboratories. The observation of the Asian epidemic from the time of its first announcement in China has brought us surprisingly little which was not either known or suspected before.

15. Jeffcoate, T. N. A. Principles of Gynæcology. London, 1957.
16. Smith, W., Andrewes, C. H., Laidlaw, P. P. *Lancet*, 1933, ii, 66.
17. Watson, G. I. *J. Coll. gen. Pract.* 1960, **3**, 44.
18. Hope-Simpson, R. E., Sutherland, I. *Lancet*, 1954, i, 721.
19. The Influenza Epidemic in England and Wales, 1957-1958. *Rep. publ. Hlth med. Subj., Lond.* 1960, no. 100. H.M. Stationery Office. Pp. 72. 4*s*. 6*d*.
20. *Occup. Psychol.* January, 1960, p. 31.

Annotations

DIAGNOSIS AND PROGNOSIS

THE changes in the organisation of training which the General Nursing Council are making over the next few years (see p. 761) include the reintroduction for parts of the nurses' register of a test of the entrant's educational assets. Those who cannot claim exemption on their record in the G.C.E. will be given a test, designed by the National Institute of Industrial Psychology, which is already used in many training-schools on a voluntary basis. In making a test compulsory for all training-schools and all candidates, the Council, by excluding the unsuitable, hope to reduce the number of students who fail to complete their course. A different entrance test with a different purpose has been proposed by Dr. L. R. C. Haward.[20] For a predictive test that excludes the girl whose educational standard is inadequate, he would substitute a diagnostic test which discloses her weaknesses, so that during her training she may be given special help and support in making good scholarly or emotional deficiencies. In the present shortage of nurses it is important to make the best use of every potential recruit, and in his view an entrance test should ask not " How

can this applicant be expected to fare in her professional examination and subsequent career?", but "What steps are necessary to make this applicant into a suitable nurse?" For this purpose he would rely largely on a test of reading ability, such as the one he has described in our columns,[21] which assesses the candidate's grasp of what she has read. He chooses this form of test because reading ability has been found to be correlated with personality maladjustments, and because in a pilot study student nurses said that their greatest difficulty was in learning complex subjects from textbooks.

The purpose of his test would not be the exclusion of the student but the guidance of her teacher, and with greater reliance on new reading methods, such as visual aids and filmstrips and new textbooks with strip-cartoons, he believes that the less accomplished reader could be helped to succeed. She should be allowed to go at her own pace, which might mean a protracted course, and would probably profit from a good deal of individual tuition. He is hopeful that even the undesirable trends of personality, which the reading test may have disclosed, could be overcome in the "malleable stage of late adolescence" by the support of tutors and others.

The growing complexity of medicine has imposed new responsibilities and duties on the nurse. Nursing is said to be the job with the highest level of technical and personal accomplishment which is open to the school-leaver today. But alongside the science of nursing the craft of nursing persists, and continued diversification of the nurse's work may in the future lead to the division of the profession into "university-trained technicians or bedside attendants" as Dr. Haward puts it. The novel possibilities of specialisation of this kind are shown by Mr. Hedley Atkins' [22] suggestion that operating-theatres, like physiotherapy or radiology departments, should be staffed by technicians without a general training in nursing.

In putting forward their new regulations the General Nursing Council express the hope that girls who are found to be unsuitable for the course for State registration will find satisfaction in rewarding and worth-while work at the bedside. The Council recognise that some may be discouraged by the unfortunate title of "assistant nurse" and a rate of pay which is less than that of an untrained nursing auxiliary. If the conditions of service were adjusted, some of Mr. Haward's "slow readers" might well find their place in this group of nurses. Work at the bedside does not necessarily require an I.Q. of 110, the standard at present set by some training-schools, and it offers scope for other qualities which to the patient seem perhaps equally important. Some years ago [23] we suggested that a common basic course might be the first part of the training of all nurses. Once qualified in this way, some would want to continue their studies for further higher and specialist qualification, but all would carry the honourable title of nurse. On the whole this proposal has not been enthusiastically accepted by the nursing profession and, like all changes, it would no doubt bring practical difficulties. But some form of it might be reconsidered, for, if the number of what are at present called "assistant nurses" is to be raised, some substantial changes will have to be made in their status and rewards. In the world of today there is no lack of competition for the services of competent, practical, and kindly women, whatever their reading ability, and often these are the very people who will serve the patient best at the bedside.

21. Haward, L. R. C. *Lancet*, 1956, ii, 1269.
22. *ibid.* March 12, 1960, p. 604.
23. *ibid.* 1945, i, 664.

SEROLOGICAL DIAGNOSIS OF SYPHILIS

ALTHOUGH the incidence of early syphilis has fallen steeply since the post-war peak of 1946, there has been renewed interest in the serological diagnosis of the disease. The identification of a phosphatidic acid—cardiolipin—as the active principle of the crude-heart-extract antigens used in complement-fixation and flocculation tests has proved an important advance. Although cardiolipin itself is serologically inactive, its mixture in definite proportions with lecithin and cholesterol forms an effective antigen which has been used in many standard tests. The use of components that chemically are fairly pure has aided the standardisation of reactivity of antigens, and lecithin has been shown to play an important part in determining their specificity.

Cardiolipin-like substances are widely distributed in Nature and can be isolated from sources as different as heart-muscle and wheat-germ. Reactions between syphilitic sera and cardiolipin, or the older lipoidal antigens, are not specific in the immunological sense; and serologists have always aimed to use treponemes themselves as antigens. This aim is realised in the treponemal immobilisation test, which is based on the observation that syphilitic sera contain an antibody which will immobilise and kill treponemes in the presence of complement. This test is now generally accepted as a sensitive and specific indicator of treponemal infection, but its technical difficulties have restricted its use to specialised laboratories. In the search for simpler alternatives, techniques involving agglutination, immune adherence, and complement fixation with treponemal extracts have been devised, but none of these has yet proved superior to the immobilisation test. An application of the fluorescent-antibody technique has been described, and the preliminary results are encouraging.[1 2] Treponemes dried on a slide are exposed to the patient's serum, and the fixation of antibody is shown by treatment with an anti-human-globulin serum conjugated with fluorescein. Examined by dark-ground illumination with ultraviolet light, the treponemes which have fixed antibody show an apple-green fluorescence.

In all these methods the virulent Nichols strain of *Treponema pallidum* is used as antigen. As the central problem of culture in vitro remains unsolved, the organisms have to be extracted from infected rabbit testes; so the amount of material is restricted. This has led to re-examination of the cultivable Reiter treponeme as a source of antigen. This organism has been shown to contain two lipoid fractions (one of which reacts with the reagin antibody in syphilitic sera detected by heart-extract and cardiolipin antigens), a carbohydrate, and a protein. This last fraction, which is relatively easy and inexpensive to make, is used in the Reiter protein complement-fixation test, which appears to be a very useful ancillary to routine tests. The demonstration that the Reiter treponeme and virulent *T. pallidum* share a common group antigen probably explains the high specificity that has been claimed for this new antigen.

At present the serology of syphilis is in a stage of transition, and the clinician may be pardoned for feeling

1. Deacon, W. E., Falcone, V. H. *Proc. Soc. exp. Biol., N.Y.* 1957, **96**, 477.
2. Censuales, S., Garofalo, V. *Riv. Ist. Sieroter. ital.* 1959, **34**, 161.

confused by the variety of antibodies which his serological colleagues are finding in syphilitic sera. Electrophoretic studies of the reagin antibody reacting with cardiolipin and crude-heart-extract antigens have shown it to be a mixture, and different " reagins " may, it seems, appear at different stages of syphilitic infection; reagin is also distinct from the specific immobilising antibody. Two agglutinins for virulent treponemes have been found, one of which can be absorbed by lipoidal antigens. The antibody-fixing complement with the Reiter protein antigen again differs both from reagin and the immobilising antibody. Although the behaviour of these last two antibodies in syphilitic infection is now well documented, such detailed information about the newer tests is largely lacking, and we do not yet know whether any of them will indicate the presence of continuing active infection in a treated patient.

The introduction of the more specific treponemal tests has drawn fresh attention to the non-specific reactions given by lipoidal antigens. Positive antenatal serum tests may present the clinician with a difficult decision about treatment, and a recent survey [3] suggests that a considerable proportion of the positive findings in pregnancy may be non-specific. In these cases the more specific treponemal tests may give valuable help. Some disorders of the collagen group, particularly lupus erythematosus, are often associated with persistent non-specific reactions, which are sometimes of high titre. These may antedate the other manifestations of the systemic disease, and the finding of a chronic biological false-positive reaction should not be passed over lightly. It seems likely that with the diminishing incidence of syphilis non-specific reactions may become proportionally commoner; and it is fortunate that we now have more specific tests to aid in their identification.

REST IN BED

WARD sisters delight to see their patients neatly ranged in bed, blankets tucked tightly across their legs, pillows all turned one way, and bed wheels in line. Doctors, however, have come to regard lying in bed as a hazardous occupation; for venous thrombosis and pulmonary embolism, retention of urine, bronchopneumonia, joint deformities, and osteoporosis may result.

Bed rest is traditional and reasonable in many diseases but of proved value in few. Progressive cardiac enlargement and death after rheumatic fever are commoner in patients who have not rested at the onset.[4] After myocardial infarction the risk of cardiac rupture is greatly enhanced in restless psychotic patients [5] (and in dogs cardiac aneurysm develops more often after experimental infarction if full activity is allowed [6]). Paralysis is less common in those who have rested in the early stages of poliomyelitis.[7] Of all medical treatments of peptic ulcer, only bed rest and stopping smoking seem to increase the rate of ulcer healing.[8] Bed rest is usually thought to be the most effective available measure against infective hepatitis [9] (though American soldiers in Korea, managed on more liberal lines, showed no ill effects [10]). And here or hereabouts the evidence ends. Beyond this the case for bed rest is based on clinical impression.

Burch and Walsh,[11] in New Orleans, have reported good results from long-continued bed rest in 5 young adults with cardiac enlargement and failure of unknown cause. Standard treatments for up to two years had been ineffective. The patients were strictly confined to bed for up to thirteen months, in cool air-conditioned wards. Digitalis and diuretics were continued. All showed striking reduction in heart size and clearing of failure.

Possibly fashions have changed too much, and some doctors and patients should be less impatient to be moving.

ARTIFICIAL LOWER LIMB

AMPUTATION was originally performed to save life; but the indications have been extended and surgeons nowadays may recommend amputation in order to improve function. Limbs whose function has been impaired by severe infection, ischæmia, or trauma, or congenitally deformed limbs, may be amputated in the interest of locomotion. Obviously the decision whether to advise amputation for such patients depends on the quality of artificial limbs. In general, the quality of artificial limbs for below-knee amputations is excellent, and with a below-knee amputation many amputees can lead a virtually normal life; but most surgeons would admit that function with an above-knee amputation is much less good. Above-knee amputees adopt one of two basic types of gait. They may walk with a stiff knee, lifting their pelvis high on the affected side and rolling the leg out with a circumduction movement—the so-called pylon gait. This is an ugly gait and requires considerable excess expenditure of energy with much strain on the hip muscles. Alternatively, they may walk with a free swinging knee-joint and a resultant abnormal heel rise, again lifting the pelvis on the affected side. This gait, too, demands a considerable excess expenditure of energy; and experience has shown that this may significantly shorten life by straining the cardiovascular system of the elderly.

At the University of California workers have for some years conducted fundamental research into normal and pathological gait, including the gait of patients with stiff knees and amputees.[12] In a normal gait the knee flexes early in the swing phase of walk and then straightens as the heel comes to the ground, flexes slightly in the middle of the stance phase, and again straightens just before the end of the stance phase; and as the foot again leaves the ground flexion begins again. In these movements the centre of gravity shifts little, and the leg acts as a double pendulum thus diminishing strain on the hip muscles and requiring less energy expenditure. Energy is absorbed at the knee in order to decelerate the leg and foot during the swing phase, and some of the energy is stored and returned to the system in a later part of the swing phase by continued forward acceleration of the body at a time when most of the body's potential energy is being lost. Locomotion is due not only to the push of the swinging leg, but also to the pull of the deceleration of the swinging leg.

In the past few years Prof. C. E. L. Allen, of Cape Town,[13] and his associates have been working on an improved arti-

3. *Brit. J. vener. Dis.* 1959, **35**, 162.
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7. Russell, W. R. *Brit. med. J.* 1949, i, 465.
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ficial limb for above-knee amputees which will permit some of these desirable physiological features. This limb has an artificial tendo achillis between the heel and the back of the lower end of the thigh-piece of the leg; as a result dorsiflexion of the foot causes slight flexion of the knee, so that at the end of the stance phase of locomotion, when the foot is dorsiflexed, the knee starts flexing before the leg is lifted from the ground. In addition, an ingenious spring bias system is incorporated which has three functions: (1) it acts as a shock absorber; (2) it prevents over-flexion of the flexed knee on weightbearing during the stance phase (in other words the knee is stable without being either hyperextended or locked by pressure of the heel on the ground); and (3) the spring stores energy during the stance phase and this energy is released on the swing phase to produce extension of the knee, which is slow in the early part of the swing phase but more rapid in the latter part. This limb has been found to produce a far more physiological gait than any other limb for above-knee amputees; and æsthetically it has proved more acceptable as the shin-piece consists of a light metal tube covered with foam-rubber and plastic material.

An ideal artificial limb should, like a woman's shoe, be cheap, durable, beautiful, and functional. It is too early to say yet whether this one will fulfil all these requirements; and it should be tested more widely—in particular full studies of gait and oxygen consumption are essential. Professor Allen insists that this type of research should be performed at universities or comparable institutions. He has patented the limb with the intention that it shall be available at the lowest possible cost to all persons. Whether or not this limb proves widely acceptable, we can all join in wishing the University of Cape Town every success in the endeavour to provide an ideal artificial limb for all who need it.

RELIEF OF SPASTICITY

IN patients with spastic paraplegia, whether the lesion of the spinal cord is complete or incomplete, reflex spasm of the lower limbs often causes severe disability. Usually these spasms follow any slight stimulus to the legs, and often they seem to occur spontaneously; and they give rise to flexion at the hips and knees, and less commonly to extensor spasms. These episodes are painful and exhausting for the patient, and they cause serious difficulties in nursing. While in many cases if the spasms can be abolished the remaining voluntary power is inadequate to give useful movement of the limbs, in others the spasms are entirely responsible for inability to walk, and their abolition will allow a much wider range of activity. It is therefore not surprising that many methods should have been tested in attempts to overcome these disabling reflex movements. Pharmacological, surgical, and physical methods have all been tried.

The many drugs which have been employed include barbiturates, mephenesin, curare, chlorpromazine, zoxazolamine, methocarbamol, meprobamate, and thiocolchicoside. Each of these drugs has brought about relief in isolated cases; but none has proved consistently effective, and often the dosage required to produce benefit has resulted in unpleasant side-effects. From Australia O'Rourke et al.[1] now describe the use of tigloidine, which may prove to be the most effective oral remedy yet employed for this purpose. Tigloidine is a close homologue of atropine; but in therapeutic doses it produces no parasympatholytic side-effects, nor apparently does it depress respiration or cause muscular paralysis in daily doses of up to 30 mg. per kg. body-weight. Many patients were treated with up to 2000 mg. daily without significant side-effects except elevation of mood. Altogether 21 patients were treated; all had spastic paraplegia with muscular spasms. Only 1 patient failed to derive any benefit; the remaining 20 showed considerable relief of muscular spasms and spasticity. If these results are confirmed tigloidine is likely to be a useful drug in the treatment of such cases.

Surgical methods have also been of value in certain cases. Anterior rhizotomy, section of peripheral nerves, and repeated procaine injections of, say, the sciatic nerve are all successful occasionally [2] but have the serious disadvantage of paralysing completely the muscles supplied by the motor roots or nerves concerned. Hence these techniques are not usually applicable to ambulant patients. Similar unwanted effects follow intrathecal injections of alcohol [3] and mephenesin,[4] and these drugs also affect sphincter control adversely. More recently it has become apparent that intrathecal injection of phenol in 'Myodil' or in glycerin may be singularly effective in relieving flexor spasms [5 6] without producing unpleasant permanent side-effects. In two important communications Nathan [5] and Kelly and Gautier-Smith [6] have described in detail the technique of giving the injection and the results in two substantial series. (Intrathecal phenol in lipid solution was first employed by Maher [7] for the relief of intractable pain; and he was also the first to record [8] the relief of flexor spasms by intrathecal phenol.) As Nathan points out, the injection in effect produces a chemical anterior rhizotomy; but the loss of voluntary power, though generally sufficient to abolish or greatly reduce the flexor spasms, is seldom complete. The solution most often used is 20% phenol in glycerin, and the amount injected at one time is 0·5–1·5 ml., according to the number of roots to be attacked. The patient is carefully positioned so that the injected material will flow downwards on to the roots concerned, and this position is maintained for some thirty minutes. Some days or weeks later the injection can be repeated in order to affect the contralateral roots. Nathan has treated 25 patients, and Kelly and Gautier-Smith 32 patients. Cases of cord injury, disseminated sclerosis, motor-neurone disease, and many other conditions were included. Relief of symptoms was achieved in all, and sometimes this was dramatic. Some patients who had not walked for several years were enabled to do so, and in the others the relief of spasms made nursing very much easier. Disturbance of bladder control commonly follows the injection, and is occasionally permanent, particularly after bilateral injections; but in many cases this complication can be avoided, and with improved techniques it may even become avoidable in all. There can be no doubt that judicious intrathecal injection of phenol has transformed the lives of many patients with severe flexor spasms. In view, however, of the Australian work referred to here, it would seem justifiable to recommend a preliminary trial of tigloidine, which alone may suffice to relieve symptoms in some of the less severely affected.

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THE PERSONAL DOCTOR
AND HIS RELATION TO THE HOSPITAL

Observations and Reflections on Some American Experiments in General Practice by Groups

T. F. Fox
M.D. Cantab., LL.D. Glasg., F.R.C.P.

IN this country we have one big experiment in medical care, and a few little ones. In the United States they have a great many experiments; and I went to see some that bear on the future of general practice.

What I shall describe is not the pattern of American medicine but rather the efforts of people who are trying to improve on that pattern. And obviously my few weeks in the States do not entitle me to say whether, or how far, any of these efforts will succeed. But of one thing I am certain—that an occasional look at what is being attempted in other countries can help us to decide what we really want for ourselves. Or don't want.

* * *

Some forty years ago the Soviet planners, for their part, decided that general practice was already an anachronism: even first-line medical care, they said, should be given by specialists. Hence in the Russian town the patient goes to a policlinic, and in the country he goes to a small hospital staffed by a team consisting perhaps of a surgeon, an internist, a pædiatrician, and an obstetrician. In Russia the equivalent of our general practice is thus provided by low-grade specialists, who are the peripheral and most subordinate officers of a unified medical service.

In Britain since 1948 we have taken quite a different line: we have declared that hospital work is for specialists but general practice is (and ever shall be) for general practitioners. Our practitioner is and remains an independent doctor, whose professional prestige can be as high as that of his hospital colleague. The previously growing tendency for practitioners to become part-time specialists has been checked by putting the two branches of medicine under separate management. Thus general practice as we know it has been preserved for posterity—carefully sheltered from the prevailing wind of specialisation.

In America, where this wind has sometimes been a hurricane, one can study its effects; and they include some alternative ways of doing the work that general practitioners do here. When I have said something about these, I shall return to the question I took across the Atlantic. Is the independent practitioner really out of date? Would his functions in fact be better performed by medical groups based on the hospital? If we continue to preserve him, what exactly are we trying to preserve?

PRACTITIONERS WITH BEDS

General practice in Britain and America differ strikingly, of course, in their relation to the hospital.

In Britain, as I have said, the tendency before 1948 was for practitioners to develop a specialty; and quite a lot of them combined family doctoring with surgery. Unfortunately, in cottage hospitals with small staffs, some of these did far more difficult surgery than was proper: and reaction from this abuse was probably the main reason why, in the new service, the hospital boards deprived so many practitioners of the beds they formerly controlled. The public, it was felt, would be safer if nearly all specialised work were put in the hands of whole-time specialists rigorously selected for the purpose; and the large majority of the 23,000 N.H.S. practitioners cannot now look after their patients in hospital. In England and Wales fewer than 10,000 beds remain in their large.

In the United States, by contrast, the majority have easy access to hospital beds. Most of the community hospitals (which correspond to our former cottage hospitals and other voluntary hospitals) were originally built on the plea of the local doctors; and the classical pattern is that all these doctors are on the staff. What surprised me, however, was to find that the staffs of even large and important hospitals often include people who, if not general practitioners in the more comprehensive sense, are undertaking general medical care. Accustomed to the sharp British division between Specialists and Others, I expressed this astonishment:

> "This may be fine for the doctors," I said: "but if I get as far as a big hospital, I want to be treated by someone who's giving his whole time to hospital medicine. Maybe you don't let a general practitioner operate; but, even so, some medical emergencies are just as tricky as surgical ones. For my full-time illness, I want a full-time specialist, not a part-time one, even if he *has* been looking after my health for years."

But the Americans, naturally, have an answer to this, and a good one. It is that the large American hospital, like the American home, has fewer *doors*—that life inside it is lived more publicly.

INTERNS AND TEACHERS

Dr. A, a youngish internist,[1] is still only a part-time specialist in that he does what we should call general practice at a health centre, visiting patients' homes; but he is also one of the 200 doctors on the staff of the local community hospital and is on the teaching staff of a famous hospital in Boston. "When I send a patient in," he told me, "the intern gets busy, and then the resident, and treatment is started. The intern may ring up to say what he's doing. By the time I visit, all the wheels may be in motion." Though this patient is Dr. A's responsibility, the whole-time staff will do teaching rounds on his cases, and so may members of the visiting staff—a distinguished hæmatologist, for instance, on an occasional pastoral visit.

In a big teaching hospital the chief of the medical service may actually think of his department as a hierarchy in which he has final responsibility for all patients, though he delegates it to some part-timers. In

1. Internists are specialists in internal medicine—i.e., general physicians. Interns are junior housemen, and residents are senior housemen.

smaller hospitals, no doubt, a full-time chief will be more anxious not to seem to interfere with the treatment of cases admitted under their own doctor. But, even so, Dr. A thought it the duty of any chief of service to interfere if a mistake comes to his notice. The other day, for instance, his chief of service had tactfully rung him up to ask whether he knew that one of his patients had lately been on cortisone, which might be an alternative explanation of some of her symptoms. " No offence intended," said Dr. A, " and none taken."

The key to all this is the word *teaching*. At first, in my insular way, I interpreted this as instruction of students; but the Americans very rightly apply the word also to instruction of interns and residents; which means that any round with junior staff, in any hospital, should be a teaching round (though I gathered that it all too often is not). The full-timer who can take his juniors to see and discuss any case in the hospital, in even the most private bed, can be a pretty effective safeguard for the patient against errors arising from insufficient knowledge or attention; and the publicity of practice in a large hospital means that the doctor who admits the patient, though he retains responsibility, will readily get advice if need be, even if he does not seek it.

Admittedly, a great many American hospitals—even quite big ones—have no interns and no full-time specialists: they are staffed entirely by people who are doing general practice as well as hospital work. But the number of such hospitals is likely to diminish. The trend towards specialisation is manifest in efforts to persuade the hospital authorities to appoint a full specialist as chief of each main service—or at the very least a surgeon who does nothing else but surgery. The hospital may then rule that at all operations the full-time surgeon shall be scrubbed up and ready to help; or a plan may be introduced whereby the surgeon assists the practitioner with the easy operations while the practitioner assists the surgeon with the difficult ones.

COLLECTIVE RESPONSIBILITY

The lack of fully specialised staff means that at present one's chances of dying quietly in a hospital bed with the wrong diagnosis are higher in America than in Britain.—Quietly in the sense that nobody knows, except perhaps the nurses; or that if one's colleagues know, they can do nothing about it.

But here again the risks of a libertarian system are being countered by characteristically American devices. Already two years ago some 75% of general hospitals (though only 25% of hospitals with less than fifty beds) were approved by the Joint Commission on Accreditation; which means not only that they reach a tolerable level of facilities for patients and staff but also that the doctors take steps towards collective responsibility for their work. Thus, on the surgical side, records must include a provisional diagnosis, recorded wherever possible before operation: all tissues excised must be reported on by a pathologist; and a " tissue committee " must report periodically on these data. Likewise admissions and discharges (including deaths) may be discussed at one of the monthly meetings, which must be attended by at least half the staff. Some hospitals hold " case conferences " at which one or two doctors are asked to discuss a subject in the light of their (not always very good) results. A neighbouring medical school, invited to provide lecturers, may send one or two senior men to look through the hospital records, in search of subjects on which teaching is specially desirable. And sometimes an attempt is made to assess the quality of the hospital's work by a formal review—a " medical audit "—of its records and the activities of its doctors.

An experienced medical administrator said to me that in a good hospital such formalities as tissue committees and medical audits do more harm than good: what really matters is to have a staff that trust each other and consult each other fully. But they can be, and are, a great help to the reformer who—sometimes against heavy odds—is bent on raising the standards of his hospital. I was assured, moreover, that American doctors generally do not mind their failures being discussed by colleagues—even colleagues with whom they are competing for practice—provided the discussion is private. Like the Russians and the Chinese, they claim to be able to tolerate sessions for self-examination—a moral accomplishment which we British so far show little sign of emulating.

FREEDOM—WITH SAFEGUARDS

But I must not wander too far from my argument. The main point I have made so far is that, whereas in Britain all but a few hospital beds are reserved for full specialists, in the United States a great many such beds are at the disposal of general practitioners and part-time specialists. Hence the profession is not, as in England, sharply divided, at the hospital gate, into specialist sheep and generalist goats.

This American system can work well—for the patient as well as for the doctor—provided the hospital's standards are set, and unobtrusively preserved and promulgated, by full specialists. In the large hospitals these men exert their influence through consulting with the part-time staff and through teaching the interns. In small ones the patient gets increasing protection (though sometimes posthumously) from critical reviews by outsiders and by the staff themselves.

VARIOUS KINDS OF GROUP

In America, as in Britain, a great many practitioners are still in " solo " practice. I met a few of them, including one so oldfashioned as to prefer to practise from his own home (" far more convenient than driving down to an office every time a patient calls "). But I am less concerned here with the ways in which American practice resembles our own than with some of the innovations—the efforts to do something different. My picture is correspondingly distorted; and the reader (like the visitor to the U.S.A.) must everywhere remember that " this, of course, is not America ".

What I was looking at were various forms of group providing first-line medicine; and in its simplest form such a group is the same as an English partnership, except that its office will be equipped for more investigation and may have more ancillary staff—besides being probably a better building with more amenities. Among the people I would gladly have as my family doctor were two partners in a small town in Wisconsin (one of whom, as a university preceptor, always had a student under instruction) and three men working from their own centre in North Carolina but also teaching on outpatients in the university hospital.

Where the American groups diverge from their British counterparts is when they begin to turn into clinics offering *specialised* investigation and care. Sometimes the result is

a modest affair proportionate to local needs, but sometimes it is—well, the Mayo Clinic. The process begins through the drive of some doctor who sees that the requirements of the neighbourhood are not being met; or one who must have a larger supporting structure for his genius; or one who merely wants to expand his business or find scope for his organising talent. But as the group gets going it may develop a life of its own, and new motives. I was fortunate enough to see what seemed to be various stages of this process, as well as several different types.

Natural History of the Private Clinic

The first two were still at the stage of being expressions of a personality.

1. *An Organised Partnership*

One was in a little mountain town. On the best available site within easy reach of the hospital, a well-qualified surgeon was practising with two associates. His long shed-like building was unpretentious; but as an artist he had lined each room with a different wood, and had given the consulting-rooms the friendly look of home. As an organiser, however, he had pursued Modern Efficiency as far as she would go (which is sometimes rather further than she ought), with light signals outside the examining-rooms, internal loud-speaking telephones by which anybody could talk to anybody, and music from the consulting-room ceiling. My guess is that this little mountain practice will soon get bigger and more specialised.

2. *An Enlarging Clinic*

The other had already done so.

Before the war three doctors, with local support, transformed an old school into a small hospital. This they then transferred to the community; but a symbiotic arrangement was made whereby the hospital took part of the private doctors' fees and in return provided them with " offices, nurses, technical staff, equipment, laboratories, medicines, bookkeeping services, and other conveniences ".

A condition of the public grants with which the hospital is being rebuilt to 100 beds is that the private clinic shall no longer be in the same building; but hospital and clinic will continue to be " mutually convenient to each other ". Under the leadership of an able and indefatigable surgeon, aided by an able administrator, the clinic and hospital represent a big addition to the medical resources of the area; but it still seemed to me more of a private enterprise than a public utility.

The doctors in the clinic all work for their own fees: the surgeon thinks that salaries lead to laziness and slow work. Some of them still provide general medical care from their clinic offices, and I asked one of these whether he really *liked* listening to patients with minor ailments. With a wry smile he replied: " It's worth it."

SECOND GENERATION

The two groups I next describe belong to the second generation, having proved viable after their originator had gone. The first is interesting because, though it is a specialist group, general practice in the neighbourhood is still an important part of its activities. The second illustrates the natural fate of general medical care in an increasingly specialised organisation—unless a deliberate effort is made to preserve, develop, or transform it.

3. *A Clinic with Much General Practice*

A quarter of a century ago a doctor working from an A.D. 1750 mansion in a township near Boston decided to give up his lawn and build a medical centre. Much enlarged, this is now owned and run democratically by the Dedham Medical Associates. Specialists of all the main kinds have sessions at the clinic; and both consultations and investigations are easily arranged. But, as I said, the really noteworthy thing is that this medically sophisticated group is still providing personal or family medical care for the local community (as its founder did in his nextdoor mansion); and, stranger still, the five members of the group who do this are paid individual fees and are thus in competition not only with the local practitioners but with each other.

These five doctors are not general practitioners but internists, and they can take their patients into the hospitals where they are on the staff. Normally they see their patients at the clinic, where each has his own room; but they pay home visits, up to 20 miles away—the fee being perhaps 5–7 dollars for an ordinary home visit, mounting to as much as 25 for a long distance. Even though the clinic is now long established, local practitioners never refer cases to it; but neither external competition nor internal competition seems to disturb the group's equanimity. Patients sometimes want to change their doctor, but (said the present chairman) if one joins a group one must be prepared to give and take: what matters is not what is good for the doctor but what is good for the patient. New members are chosen with deliberation, and during the first year they spend some five months deputising for their seniors when these are on holiday. At night the telephone is answered by a lay person who is paid to take and refer the calls: at weekends *three* of the five doctors are on duty, for it is found that if the weekend work is done by only one he is exhausted on Monday.

4. *A Clinic with Little General Practice*

From this relatively small building in a populous area we pass to a remarkably big one in the little Wisconsin town of Marshfield, which has perhaps 10,000 inhabitants. Like the Mayo Clinic in neighbouring Minnesota, the Marshfield Clinic exports medical care, getting patients not only from its own State but also from far away; and that is the reason why the Roman Catholic sisterhood who provide the 280 pay-beds at the local hospital are already finding these too few. Several of the clinic staff of 38 specialists have appointments in universities, and at least one has an international reputation; but for old time's sake the internists among them still accept local people as their personal patients whom they visit if need be.

For all this arose out of a general practice. The founder, Karl W. Doege, " only a small town doctor but full of love for his profession ", believed in better diagnosis and treatment through " intimate association of physicians in their work, constant study and mutual assistance ",[2] and in 1916 he brought five other men into a well-knit clinic group.

The members of this group, joining after three years' probation, are paid on the same scale regardless of specialty or number of patients seen: " our present plan is based on the assumption that each physician is as valuable to the organization as any other ". Related to age, experience, and years of service with the clinic, salaries rise till 60 and then decline till 65, when the member loses his vote.

Providing security and fine facilities for work, the clinic is virtually (though not legally) a non-profit-making organisation. People who regard it (or one of the members) as their own doctor pay lower fees than the far larger number who are referred for consultation; and sometimes a little embarrassment arises over referrals because the clinic is thus in competition with the other 7 practitioners in the town.

Large and specialised though it is, it is still in general practice.

But at Marshfield personal medical care is a merely vestigial function, and we cannot look there for our shape of things to come.

Two Planned Experiments

From these illustrations of the natural process of specialisation I turn to two carefully planned attempts to develop general practice as part of a balanced medical

2. Baldwin, R. S. *Group Practice*, August, 1959.

service. With support from Funds and Foundations, these experiments are being made in rural counties which had previously had hardly any specialists.

The first is based on a hospital, the second on a private clinic.

HUNTERDON

Hunterdon County, in rural New Jersey, with 45,000 people, had about 25 general practitioners and 12 public-health nurses, but no hospital and no specialists. Farsighted citizens decided against having "just another hospital" and have cooperated to create one with teaching-hospital standards and progressive outlook which should be the county centre not only for medical practice but also for public health and teaching.

With 120 beds, the hospital is staffed (a) by permanent specialists, of whom 17 are full-time, and (b) by almost all the local general practitioners. The specialists, as faculty members of New York University, spend one day each week at the Bellevue Medical Center: all their earnings go into a professional group fund from which they are paid (regardless of specialty) what is to all intents and purposes a regular salary. The medical board is composed equally of specialists and practitioners, appointed by the board of trustees. Some of the hospital's interns and residents are particularly attracted to it by the prospect of learning something about general practice, and a few students spend a month or two there "to gain an understanding of community medical practice".

As a hospital Hunterdon is outstanding: its pædiatric department, where mothers have always been encouraged to come in and help,[3] is only one of many good things. As a public-health centre it has had some successes but also setbacks: it has not become the focus of local welfare services or of a county health department.[4] But here I am concerned only with its effect on general practice.

It has given the local doctors a diagnostic centre to which they can bring their patients: examining and auxiliary rooms are used by all doctors alike ("we purposely want the specialists and general practitioners to be falling over each other"). It thus gives them and their patients the benefit of easy and personal consultation; and they also participate, if they wish, in weekly staff and departmental conferences. In all this Hunterdon avoids "the two medical traps into which so many rural hospitals fall: either they are medically mediocre because they lack specialists; or, if there is a specialist corps, it runs things at the expense of the voice, stature and potentialities of the family doctor".[5]

The facts of hospital life have to be faced; but all save one or two practitioners seem to be now content that patients admitted under their care are ultimately the responsibility of the full-time specialists, who make daily rounds and can offer suggestions. That in the hospital the practitioner is no longer really in charge is shown by the following interpretation of his duties:

> "He has a continuing obligation to the patient after his admission to the center, and he takes an active part in discussions concerning treatment. He thus maintains his contact with the patient and his family, writes orders, scrubs to assist in surgical procedures, if he so desires, and thus shares responsibility with the specialist on the staff for the selection and application of the best in modern therapy. He attends medical and pediatric patients and makes uncomplicated obstetric deliveries. The responsibility for normal obstetric practice is his, the role of the director being almost entirely advisory and, as the occasion requires, supervisory."[6]

This is a gallant and exciting experiment—at least partially successful. But it leaves me with two doubts.

First, if you have a hospital with not only full-time specialists but also residents and interns, can you continue to say that the patient's own doctor remains in any real sense in charge of him after his admission? Having let the consultant take over his role as arbiter, the practitioner finds that his lesser role as the patient's attendant has to be shared with the intern or resident; and it is hardly surprising that, at Hunterdon and elsewhere, doctors admitting their patients have sometimes felt that, while helpful consultants are one thing, helpful interns are quite another. Yet the intern, who is on the spot, can scarcely be blamed if he talks to patients, and he may easily seem to take too much upon himself. Is the arrangement functionally sound? Or should we not perhaps interpret these difficulties as showing that the bedside team becomes in fact too large and cumbrous if the practitioner is introduced as anything more than a welcome visitor?

Secondly, what effect has this kind of attachment to a fine hospital had on the doctor's professional habits at his own "office" or surgery, five, ten, twenty miles from Hunterdon? May he still, for instance, be seeing far too many patients in an afternoon?

RIP VAN WINKLE

The second experiment—even more gallant actually—is quite different; and whatever shortcomings it may have it cannot at any rate be criticised for leaving the doctor's office unchanged; for it includes a direct attempt to upgrade medical work at the periphery. Instead of leaving personal care to the individual practitioner, it aims at meeting the medical needs of a county through half a dozen widely spaced group clinics working in close relation to the centre.

The story is at first not unlike that of other groups. An able young surgeon was persuaded to come back to his home town of Hudson, in the small farming county of Columbia in New York State. With a partner he started what became a clinic, and (known since 1946 as the Rip Van Winkle Clinic) this has a strong family resemblance to others I have described. Very busy, and attracting some patients even from New York City, it hopes to move from its present cramped building to a site opposite the community hospital to which its members admit their patients. It is a true group in that the members put private fees into the pool from which they draw their salaries; and the salaries have steadily gone up.

What is chiefly remarkable, however, is that this clinic—a piece of private enterprise—is now conceived as the nucleus of comprehensive medical care for its county. Already in three areas which have lost their doctor through death or retirement, the Rip Van Winkle Foundation has set up a small well-equipped clinic—two being in old houses while one is an exemplary new building. The basic team in these clinics (when achieved) is to be two internists, a pædiatrician, and a dentist: thus the doctors in charge are not general practitioners in the usual sense but specialists.[7] They live in or near their clinic but visit Hudson, and they are in turn visited weekly by a surgeon and an obstetrician-gynæcologist. Regular vans take people, equipment, and specimens to and from the centre.

COUNTRY VERSUS TOWN

In the U.S.A., as in many other places, the young doctor does not readily go to work in the country. The Hunterdon Hospital is trying to make rural New Jersey attractive by offering him the kind of diagnostic and therapeutic facilities he learned to use in his medical school, and an academic atmosphere. The Rip Van Winkle Clinic is trying to make rural New York State attractive by likewise offering opportunities for really good work with some academic stimuli. It enables young specialists to take such work without having to "assume responsibility in areas in

3. Hunt, A. D., Trussell, R. E. *Modern Hosp.* September, 1955.
4. Trussell, R. E. Hunterdon Medical Center. Harvard University Press, 1956.
5. *Architectural Forum*, December, 1953.
6. Rannels, H. W. *Postgrad. Med.* 1959, **25**, 180.
7. All the staff are Board-certified or Board-eligible in their specialty.

which they are not comfortable ", and it offers a guaranteed salary and often a house from the start.

To those who really like looking after people in their everyday life, and who like the country, these conditions may well seem almost perfect; and there are youngish doctors in the Rip Van Winkle clinics who seem ready to make general medical care their lifework. On the other hand the scheme has not succeeded in incorporating the general practitioners of the county, and some difficulty arises from the fact that the doctors it has imported are all specialists. The probable reason why the turnover of staff has been disappointingly high is that all these young doctors have been trained as internists and pædiatricians, not as general practitioners; and after a period in rural Arcady the young internist is apt to reflect that elsewhere he could be doing much more specialised work which would interest him more than the endless repetitions of local family care—and could be earning more money. In a large city such as New York the trained internist may be willing to do some general practice—as the price of staying where he wants to be. But, if he goes to the country, he expects to work as a specialist.

Though hindered by the young internist's tendency to move on, genuinely personal care is the aim of the Rip Van Winkle Foundation; and the clinic is unique, among other things, in being the only group under the Health Insurance Scheme of Greater New York (H.I.P.) which offers prepaid medical care to individual families.

Three H.I.P. Groups

Of rather more than 3 million Americans whose general medical care is covered by prepayment schemes, about 550,000 are members of H.I.P. At present, except at the Rip Van Winkle Clinic, these are all enrolled corporately as vocational groups (e.g., all the employees of a firm who wish to join)—an arrangement that removes the risk of selection by " bad risk " individuals or families. Almost all the care is given by 32 medical groups, which make their own arrangements within limits set by a medical control board, and provide (with loans or otherwise) their own premises or equipment. H.I.P. defines group practice as

" provision of preventive, diagnostic, and curative medical services by family physicians, specialists, and other professional and technical staff working as a team in a group center, pooling their knowledge, experience, and equipment, as well as income ".

It gives the group about 32 dollars a year (it hopes to raise this) for each person on their list: and after the group have paid their expenses they distribute the balance among their doctors, as they think best, according to such factors as number of hours worked weekly in the group, number of years of postgraduate study, and length of service with the group.

" The security of an assured income and retirement program, the relief from discussing fees and from sending and collecting medical bills, and the knowledge that costs will not deter patient cooperation permit the H.I.P. physicians to be primarily concerned with the provision of good medical care." [8]

Groups have an average of about 30 doctors, of whom about half are specialists, with regular sessions, and half are family physicians. Even the latter may do private practice, but the only charge they may make to H.I.P. members for normal services is 2 dollars for calls requested and made between 10 P.M. and 7 A.M. On the preventive and welfare side, help is given to groups by headquarters consultants in health education and community resources. The medical control board requires " a base-line history and physical examination for each new adult enrollee as soon as feasible after joining the medical group . . ."

Only well-qualified doctors are appointed to the groups, and some 10 million dollars has been invested in the centres.

As evidence of the advantages of the care it provides, H.I.P. cites an inquiry showing that perinatal mortality (per 1000 live births and fœtal deaths) was 21·3 among its members compared with 30·1 for all private patients in New York City. In another investigation, annual hospital admissions were found to be 77·4 per 1000 among H.I.P. members against 94·8 among people who had similar hospital coverage but got their general medical care differently.

I was able to see something of three of these groups.

A CITY GROUP

The first showed how general practitioners in a group can fulfil their task without overwork, confining it to office hours.

Originally a small specialist clinic, the building was rather shabby and cramped, but the doctors seemed friendly and consulted each other freely even about their private patients whom they saw on the premises. The personal care was given by general practitioners, who had no offices of their own outside; and, though they had sessions at municipal hospitals, they could not take their H.I.P. patients into these.

Their elected chairman does not believe in overwork—" the tired doctor misses important signs "—and the hours are down to 35 a week with none on Saturday or Sunday. From 8 A.M. till 7 P.M. one or other doctor is on duty for " house calls " (summons to the patient's home): after 7 these are taken by two competent and well-qualified outside doctors hired for night duty.

The group preferred more leisure to more money, and did not mind confining their work to their clinic. Boring? No: they had their weekly session or two in hospital, and they met people when off duty. They would be quite happy if the clinic were part of a hospital building. To attach particular patients to particular doctors was unnecessary: the group had been there some time and they were all known and trusted. But they would have liked to be able to give more time to each patient.

A SUBURBAN GROUP

The second group, far from the centre, was very different. Here the general medical work was done by internists.

Serving a scattered population, this group had two clinics. The one I saw had lately been built for 600,000 dollars and was a fine small health centre, with separate rooms for the children, a laboratory, X-rays, a syringe service, a library, and the usual private pharmacy in the hall.

The internists I met were highly qualified; and though they might treat boils, and sew up lacerations if need be, minor surgery was otherwise done by the surgical specialist in the nice little operating-theatre; the children were looked after by the pædiatrician and childbirth by the obstetrician. On the other hand, one of the internists doing family care also did sigmoidoscopies at the clinic. He himself was also on the staff of a good hospital, to which he could admit clinic patients; but the newer physicians had no beds yet. The doctors' homes were not far away and they had a night-duty roster. I got the impression that in general a patient was regarded as the patient of the group rather than of any particular doctor.

The admirable facilities of this medical centre were offset by some environmental disadvantages. It is situated in what was once a village, with a beautiful school; but the area has

8. Daily, E. F. *J. Amer. med. Ass.* 1959, **170**, 272.

been virtually devastated in the process of becoming an inchoate suburb, without the traditions or stability of a community. Already there is a large population, acquiring the "suburban neurosis".[9] Wives are housebound while their husbands have the car at work (they would not think of walking $1^1/_2$ miles to the shops with pram and children). What some of the doctors felt was an abuse of house calls was exacerbated because H.I.P. members are spread over a large area, and the call may be from 20 miles away—the member being determined (some felt) to get her money's worth. One doctor described his difficulty in avoiding the unnecessary use of antibiotics: the patient thought he was being done down if not given them. Whereas the private doctor is suspected of giving unnecessary treatment so as to gain money, the H.I.P. doctor is suspected of withholding necessary treatment so as to save it.

From all its well-qualified young physicians this centre demanded (or had demanded) a difficult adjustment from specialised hospital work to general medical care—in a socially unattractive neighbourhood. But its staff included several of the so-called redundant medical registrars whom H.I.P. has from time to time recruited from Britain, and these required a further adjustment. Every effort had been made to explain to them the disadvantages as well as the advantages of going to America.[10] But the resemblance of the two countries too easily obscures the differences in culture. American observers are astonished—indeed sometimes shocked—to find English patients so ready to accept their doctor and what he says to them: in the United States the patient is far more demanding, and suspicious. A relatively new arrival (much liked, I later heard) felt that in America he was treated less as a professional person: he was called in to treat the body in just the way a garage man is called in to treat the car. An experienced American colleague said: "Perhaps it would be a good thing if the doctor could again talk to the patient with more authority." I noticed that though, in this clinic, the doctor's table was small and round, so that the patient could feel equal, a small arc of the circle had been inconspicuously cut away in front of the doctor's chair.

A HOSPITAL GROUP

But the third H.I.P. group is the most instructive; for it is really a hospital group, and shows how hospitals *could* take over most of the work now done by general practitioners.

The Montefiore Medical Group, in a somewhat antiquated building beside the Montefiore Hospital, seemed to have a high morale: they believed in what they were doing and enjoyed doing it.

The 50 members (16 full-time) all belong to the hospital staff and can take their patients into hospital beds, where they have full responsibility for what is done. Compared with the general practitioners at Hunterdon for example, the Montefiore group are in a far stronger position vis-à-vis interns and residents, because they are all recognised specialists. Family medical care is provided by internists only, and the patient can be looked after by the same doctor in his home, in the clinic, and in the hospital bed. The group's patients in the hospital are visited by group members in a "grand round" once a week.

The group look after about 26,000 H.I.P. patients and make a serious attempt to give them genuinely personal care. The patient selects one of the internists as his family physician (children under 9 are looked after by a pædiatrician) and he does not see any other specialist except on referral from the chosen doctor. The latter works 25 hours a week in his office; but he also has his hospital duties, and each night 3 family doctors, as well as a pædiatrician, and a representative of each specialty, are on call. His income depends partly on the number of patients for whom he is personally responsible; but to all intents and purposes he is on a salary, since his remuneration can be calculated three years in advance. He can see private patients at the clinic out of his office hours.

The demands on this centre are increasing, but no more patients can be taken till it is rebuilt. The new building will be physically part of the hospital.

"The precondition for modern medicine in our group," says Dr. George Silver, chief of the division of social medicine at Montefiore, "is a hospital-based unit, salaried physicians, a central unit record, supervision through meetings, communication between doctors, and some form of replacement for the family physician in the light of modern urban needs."

"We recognize that the changing circumstances which have pretty much pushed the general practitioner out of the scene, at least in urban life, have not changed the situation under which the patient still wants and needs a family advisor, counsellor and guide."[11]

The internist equivalent of the "family physician" in the Montefiore group is unquestionably giving good medical care. But he still cannot be said to meet all the patient's need for support and help outside the clinic. An experiment has therefore been undertaken in which his contribution is supplemented by those of a psychiatric social worker and a public-health nurse—the three forming a "health team" which can offer a "new type of family medical practice".[12] Able to get specialised help alike from physical diagnosticians and from psychiatrist, psychologist, social scientist, or health educator, such a team can give advice, guidance, and support in the ordinary emotional stresses of the family. Dr. Silver is writing a book about this Family Health Maintenance Demonstration. He describes it as *one* way of replacing the general practitioner of yesterday and today—whose demise, he feels sure, is only a matter of time.

Home Care

That the Montefiore Hospital should be the scene of this significant sally into general practice is no mere chance; for the staff of this hospital have already made important excursions into territory outside their walls. Though the institution which first undertook the medical care of patients in their own homes was the Boston Dispensary, which started in 1796, the modern type of home-care programme originated at the Montefiore thirteen years ago under Dr. Bluestone.[13]

Hospital beds are scarce and increasingly expensive; and a great many patients with long or chronic illnesses are happier in the beds they all of them have at home. The object of the fifty-and-more home-care schemes now running in the U.S.A. is to give such patients the essential benefits of hospital care without taking them out of their natural environment—except during acute episodes when this may be essential.

Beth Israel Hospital in Boston, for example, has a team (physicians, nurses, psychiatrist, "physiatrist", occupational

9. Taylor, S. *Lancet*, 1938, i, 759.
10. The commencing salary of a member of a H.I.P. group is in the region of 14,000 dollars; and top incomes for those doing general medical care may reach as many pounds—though this means looking after perhaps 2700 patients, which is considered far too many.
11. Silver, G. A. *Proc. Rip Van Winkle Clin.* 1957, **8**, 20.
12. Silver, G. A. *Yale J. Biol. Med.* 1958, **31**, 29. Republished in the *Medical World*, January, 1960, p. 55.
13. Bluestone, E. M. *Lancet*, 1951, ii, 1078; *J. Amer. med. Ass.* 1954, **155**, 1379.

therapist, social workers, and others) who give comprehensive care to people who no longer need be in hospital but are too ill to come as outpatients.[14] Drugs and equipment are provided, and the patients are told to telephone the hospital at any time day or night if they want help.

Though the programme was designed to benefit the patients —teaching and research being secondary objectives—it offers many opportunities for education, not only of medical students but also of nurses and social workers. Participation in the home-care programme is an important part of teaching at the New England Medical Center, and at the Massachusetts Memorial Hospital it is regarded as the main clinical base for the department of preventive medicine.

Home-care programmes are mostly restricted to people who cannot afford to pay a private physician, but some are already being extended to patients under their own doctor.[15] As a Minor (or possibly Major) Prophet, Dr. Bluestone sees this as a means of salvation for the family physician; for it is a way of bringing him into the organisational pattern of the hospital and into the centre of the circle of specialists where he belongs. The hospital wall, Dr. Bluestone says, must not be used as a barrier, or as an excuse for limiting hospital know-how to patients on the right side of it:

"The hospital must help the practitioner to solve the patient's problem in his own home wherever this is possible and desirable. For this purpose, portable hospital equipment and skilled personnel which are now restricted to intramural patients must be made available to extramural patients, under conditions which leave the practitioner free to call on the hospital for either kind of service as required."[16]

The Mine Workers

To these examples of various patterns of medical care I add three from the services created for the United Mine Workers of America. Counting dependants, the Miners' Welfare and Retirement Fund (financed jointly by employers and employees) is concerned with about a million people, and the development of its medical work —largely against opposition—is a phenomenon in American medicine. In the large mining areas both hospital and general practice used often to be very poor: contract practice with the workers at a mine was sometimes at a disgraceful level, and the injured could seldom hope for skilful treatment and reablement. One step towards improvement was the simultaneous building of ten hospitals by the Miners Memorial Hospitals Association, while another is the establishment of specialised clinics and small centres for general medical care.

1. *An Outpatient Department*

At Beckley in West Virginia the Association has an excellent hospital of 200 beds with a very capable full-time staff. Its system of sterilising equipment has been studied by British visitors, and its arrangements for distributing food and stores to the wards also deserve attention. But its interest for me lay chiefly in the fact that it was a hospital trying to provide—mostly for miners and their dependants—much of the kind of care which is given elsewhere by practitioners.

In a sense this was given at a high level, for the patients waiting in the crowded central hall were all seen by senior specialists. Two of these attempted a little sorting, but all comers were then seen by one or other specialist in his own office. On the other hand, though some at least of these physicians strongly believed in personal care, the outpatients' atmosphere seemed less conducive to this than a private doctor's office; and some of the patients, if better known to the doctor, would not have needed more than a glance and a few words. I was not surprised that the medical director said that he would be glad if a couple of his internist residents with a bent towards general practice could be set up in a small nearby clinic where they could spare the hospital by doing some sorting.

2. *General Care from Clinics*

The Bellaire Medical Foundation has a central clinic in an old house in Bellaire, Ohio, and a beautiful new one 12 miles away to which some of the staff go daily by car. At least two of the internists are senior men—one being an authority on pneumoconiosis—but they all do family care. Some of the staff have access to the local hospital, where the trustees are well disposed to the Foundation; and all the group do a grand round on all the group's hospital patients once a week. But, like quite a number of the groups I have described, they work under professional handicaps or medicopolitical difficulties, and their surgeon has had only three patients referred to him by an outside doctor.

They attach some importance to keeping their own patients, and they are ambitious on the social and preventive side of their work, including periodic health examinations and the home service by which the Fund helps "independent living" by the disabled. They hope to have a psychiatrist and a psychiatric social worker someday.

Their morale was high: many of the staff, and a lawyer trustee, gave me a lot of time on a Sunday afternoon and evening.

3. *A Centre with Peripheral Practices*

If Bellaire was particularly interested in general medical care, Centerville in West Virginia was specialist-oriented. Primarily a consultation centre, it was bursting out of its quarters in a converted farmhouse and barn, and an additional large building was in construction. Patients needing admission were sent to one of three small community hospitals in the neighbourhood.

This clinic was a lively professional centre for local practitioners working for the Fund, and it hoped they would come in twice a week for consultation or meetings. I visited two of the peripheral practices. In one a practitioner, who was also a playwright, worked solo from a miners' meeting-hall, which had been turned into an austere but tolerable surgery; while in the other a couple of doctors (both new to the job but perhaps all set for dedicated practice) were installed in a well-equipped centre next door to the mortician—a variant on the more usual plan by which the doctor has a drug-store as his neighbour.

Two Questions

At clinics where general medical care was given by internists I sometimes asked two leading questions.

These men having trained as specialists in internal medicine, I asked them whether they would accept an opportunity of full-time work in that specialty. Their answer usually, though not always, suggested that their heart was still in hospital medicine rather than in personal practice.

Secondly, I asked members of the group whether they would like their clinic to form part of the buildings of the local hospital. Here the reply was, in the words of *My Fair Lady*, "Wouldn't it be loverly?"

SPECIALISATION

Much of modern medicine can be practised only by specialists; and, to complement one another, specialists must work in groups. The farther their specialties

14. Sheps, C. G. Address to A.M.A. Regional Conference on Ageing, Boston, Sept. 17, 1959. Also annual reports of hospital's department of home care.
15. Bluestone, E. M. *in* Long-Term Illness (edited by M. G. Wohl); p. 27. Philadelphia and London, 1959.
16. Bluestone, E. M. Letter to members of Hospital Administrators Correspondence Club, 1955.

diverge, the larger should be their group and the closer its integration.

Nearly always the best place for specialist work is a hospital; and, though some of the American groups I saw were what Dr. Silver calls " rootless ", I am sure the bigger ones will end by moving into hospital premises, where they properly belong. I do not say that a small group of specialists cannot work at a distance from the hospital to which they are attached; but, if they do, they will tend to think of themselves as an outpost, an outpatient department, even a sorting-station.

My own opinion therefore is that if, in any country, the general practitioner is replaced by a group of doctors trained to regard themselves as specialists, the result will eventually be provision of general medical care by and from the hospitals. The experiments I saw in the United States seemed to be leading in that direction; and, though they were atypical, they would probably not have existed if the American public had not accepted medical specialisation more fully than the public here. The more sophisticated and affluent Americans tend to bypass the practitioner, making their own provisional diagnosis and going straight to the appropriate expert:

" I called my group this morning, told them I had a bad rash and asked to see the skin specialist. This girl on the phone tells me I've got to see my family doctor first. What kind of a run-around is that when I need a skin specialist? " [17]

Among the Americans who set fashions, the majority might well think that medical care from the specialists of a hospital clinic would be the best possible.

Would they be right? Certainly the clinic or group can give its patients the benefits of specialist advice and treatment without the risk (and expense) of " shopping around ": and it will often work at a higher technical level than the outside practitioner. The task of sorting patients and giving general medical care is ordinarily entrusted to an internist or general physician—whom Esselstyn [18] describes as " the keystone of group medicine ". Whereas many independent doctors have time only for symptomatic medicine, this group internist is expected to reach a working diagnosis, and has facilities for reaching it.

As I have hinted, there can be certain practical difficulties about this upgrading of general care. Patients who drop in for a few words or a few pills may be none too pleased to find themselves given " the works ", and their request for a check-up may be taken rather more scientifically than they intended. Moreover, extra time, from a specialist with a shorter practising week, has to be paid for. In principle, however, the patient clearly stands to gain a lot from entrusting himself to a specialist physician.

The question is: does he not often lose a lot too? Are a specialist group, or any members of it, going to give him the *personal* care that means so much to so many?

PERSONAL OR IMPERSONAL?

No plans for the future are realistic unless they take full account of people's need for personal as well as specialist care. The two kinds overlap, of course. Some specialists (pædiatricians and geriatricians, for instance) practise personal medicine nearly all the time, while nearly all specialists practise it some of the time: a man does not cease to be a good doctor because he is a urologist or a pathologist. But the specialist is, by definition, called on to solve some particular problem; and he may reasonably be reluctant to cope also with the patient as a person. It is no accident that the man who is " Mr. Jones " to his own doctor should so often become, in hospital, " the hæmatemesis in the end bed ".

Many doctors and nurses spend much of their time in preventing this depersonalisation of hospital patients—especially perhaps in the United States.[19] But in any large institution depersonalisation is a natural process which can be mitigated but can seldom be abolished. It is all too evident, for instance, in most hotels.

I remember that when I paid my first visit (rather shyly) to the most famous of London hotels, I was astonished not by the splendour of the surroundings or the food—each readily equalled elsewhere—but by the natural not-at-all-superior manners of the staff, who gave one unhurried personal care. What the rich were paying for (I suddenly realised) was simply the pleasant easy atmosphere of a private house.

Nowadays most hotel-keepers are well aware that people like to be treated as people not as admissions. But big institutions always develop needs of their own which are apt to take precedence over those of their users; and only the very good hotel or the very good hospital gives its clients the sense of personal attention they would expect in a wayside inn or a doctor's consulting-room, surgery, or office.

If specialist care is the primary task of the specialist and the group, personal care is presumably the primary task of the individual practitioner. In real life, this fundamental distinction is often blurred; for, whereas many specialists give their patients not only specialised but also personal help, some general practitioners do not fulfil their particular function. A London consultant was saying to me the other day that, though in principle he favours consultations at which the practitioner contributes knowledge of the patient's history and background, he finds that many patients have never had a chance to tell their story until they reach the specialist. One explanation is that the practitioner has less time than the specialist; but often he has less inclination or has an impersonal outlook on his work. If he thinks of himself as a sorting agent rather than as his patient's real doctor, he feels his duty fully done when he recognises a possibly significant symptom and hands the case to an expert.

THE FINANCIAL EXPLANATION

In this country failure by a practitioner to provide personal care—to take full responsibility for his patients and form a strong personal relationship with them—is usually put down to circumstances: he is usually looking after too many patients, and, because he is paid by a capitation fee, he has no financial incentive to take trouble over cases that a specialist will accept. Superficial, perfunctory, impersonal practice is attributed to " the system "; and at first sight this convenient explanation gets some support from American experience.

17. Weltner, G. H., Lear, W. J. Subscriber Attitudes in H.I.P. Paper read before American Public Health Association, Oct. 20, 1959.
18. Esselstyn, C. B. *New Engl. J. Med.* 1953, **248**, 488.
19. I found that, as a doctor visiting wards, I was carefully introduced to patients, with names all round. An American doctor told me how horrified he had been in an English hospital when a registrar had taken him to see a patient and without introducing him had unrolled the sheet and shown him her leg. He had been equally shocked by the impersonal character of a ward round by a physician—who happens to be a friend of mine and a most humane man.

Even before I landed I was told that one of the big schemes of prepaid medical care, provided by groups, was progressing relatively slowly—because " people don't like it; they feel that they don't get the care and consideration they have from a private physician ". In this scheme the doctors are paid a kind of capitation fee that amounts to a salary; and, though they are a carefully selected body of men and women, an experienced observer agreed that their attention to patients was in fact less personal. This he explained by the way they are paid:

" It's a sad fact," he said, " that when you remove the direct financial bond with the patient—the fee for each service rendered—many doctors become less interested, kind, and sympathetic. A proportion *need* this financial relationship."

In New York's H.I.P. the most common complaint relates to the physician's " attitude ". (" Dr. —— was very impersonal. Never a hello or goodbye.") [17] Unhappily, in American prepayment schemes as in the N.H.S., the occasional patient wrecks the professional relationship from the start by claiming his " rights ".

On the other hand, the fee-for-service system does not necessarily ensure personal attention: one of my lay informants commented bitterly on the mechanical production-line methods of a doctor whom he was paying. For my part I regard this system as a professional hangover; and I hope that, as an alternative basic source of income, the capitation fee will prove more generally acceptable when it becomes larger and doctors can have fewer patients. But difficulties arise with *any* system of paying doctors; and I believe that, as a source of personal care, the American specialist group has a more fundamental weakness than lack of financial inducements to kindness.

LIMITATIONS OF GROUPS

The truth, I fancy, is that a large group can hardly ever perform a personal function really well.

Even a small group has difficulty in doing so. Thus Nourse,[20] though happy in having joined three specialists to form what he calls a " composite family doctor ", says that " strive as they may, no group of doctors can completely substitute for the personal touch of the old-time family doctor, for the reliance of the patient upon one individual for wisdom, counsel, friendship and help ". He begins his admirable article by quoting an indignant young man whose wife had gone into labour early, when Nourse was away duck-shooting, and had been delivered by a partner:

" What's wrong with you doctors, anyway? You aren't like you used to be. You don't really care what happens to your patients; you charge twice as much as you ought to, but when somebody needs you he can't ever find you! What's become of the kind of family doctor we used to have? "

Nourse thinks that his group is giving far better medical care than " the inadequate, sentimentalized image of yesterday "; but he hopes that we shall not discover too late that part of what we have lost is irreplaceable—" the feeling of warm personal regard and concern of doctor for patient, the feeling that the doctor treats people, not illnesses, and wants to help his patients not because of the interesting medical problems they may present but because they are human beings in need of help ".

What Nourse says about his group of four applies, a fortiori, to a group of thirty. In theory, personal medical care of the highest quality will be given: the internists who give it will perhaps have their own list of patients and may look after them for years. But I am pretty sure that in reality any member of such a group will sooner or later come to think of his patients mostly in relation to the clinic and hospital, not in relation to their work and home.

In retrospect I am impressed by the infrequency with which some of these internist-practitioners made home visits: in one group, for example, the normal number was about 5 a day. The explanation given was significant: the home, I was told, is usually a very bad place for examining anybody—you can't move the bed; the mattress sags; and there's incessant conversation and scuffling around. So the patient had better come to the clinic or hospital where one can really find out what is wrong.

Well, of course, this is the point of view of the doctor who has been trained to think in terms of disease in hospital rather than about people in the middle of their families. Surely, if you really want to get to *know* somebody, there is nothing like visiting his home, where much will always be revealed. If I wanted to discover whether a doctor had a vocation for personal care, I should begin by asking what he thought about house calls. After that I should inquire into his attitude towards the unnecessary, and often maddening, visits by which so many patients seek to form, or keep up, their acquaintance with their doctor.

Though, for myself, I should cheerfully register with the internists of the Montefiore Hospital Group—who were friendly, helpful, and competent—I do not think even they would claim to be able to give me all the kinds of help I might want as personal care. That is why Dr. Silver has undertaken the experiment I mentioned, in which the work of the internist is supplemented by that of a public-health nurse and a psychiatric social worker.[12] This is his way of compensating for the group's natural tendency to look inwards towards the hospital instead of outwards towards the home. And no doubt it will work very well up to a point. But I am not yet persuaded that any amount of compensation or ingenuity is going to make a hospital staff—or any group of specialists—the right people to give the public personal medical care. The public, I fancy, will get it better from doctors who are primarily interested in providing it, and who do most of their work at a distance from the hospital.

Hospitals are the fortresses of medicine, and should be used as the second and third lines of defence. The first line should consist of numerous well-sited posts manned by lightly armed but versatile and mobile troops, trained to use their own judgment.

I know, of course, that personal medicine must be more closely related to specialist medicine than it often is at present; but I am pretty sure that the personal doctor should preserve a measure of geographical and psychological independence from the specialists and their elaborate institutions.

TITLE AND FUNCTIONS

What kind of doctor do we want, and what is he to do? Perhaps we shall know the answer better if we find him the right name.

GENERAL PRACTITIONER?

In thickly populated countries like Britain the truly general practitioner is extinct: indeed, few of us have ever seen one. In relatively inaccessible places elsewhere,

20. Nourse, A. E. *Saturday Evening Post*, Oct. 17, 1959, p. 25.

including parts of the United States, there are doctors who do virtually everything that has to be done for their patients; and some of them would deplore any constriction of their work. (I heard of a hospital in the backwoods where none of the seven local doctors could be dissuaded from doing all his own surgery—because his patients expected him to provide full medical and surgical care and he would lose face if he proved less than omnicompetent.) But all over the world the lights are going out on that kind of general practice. Proper and necessary in an isolated countryside, it is improper and unnecessary where the patient with a difficult disorder can have this treated by a specialist. And even in the United States 57·5% of the population last year were already living in the large towns which are designated standard metropolitan areas.[21]

Because specialisation is an inescapable part of medical progress, the trustees of more and more American hospitals are ruling that only specialists shall operate, or do obstetrics, or even have admission rights; and the result in cities is that the general practitioner's practice grows palpably less general. Against this trend the Academy of General Practice is fighting a rearguard action. Though some of its 25,000 members may be partly interested in preserving lucrative occupation, the Academy has done much to improve morale and raise standards among practitioners; and it believes (as I do) that something very important to the public will be lost if what remains of general practice is taken over by the Man from the Hospital. But has it really chosen the best ground for its stand? Nowadays the argument that a qualifying degree gives the doctor a right to do any kind of medical work is quite out of date: we all know that occasional surgery or midwifery is even more dangerous than occasional motor-driving; and unless people are fully competent to do things, and keep themselves in practice, they have no right to do them at all—whatever degrees or tests they took. The Academy, surely, should recognise that truly general practice, except in remote areas, is already finished, and that most of its members are very sensibly doing something far less ambitious and terrifying.

But perhaps their residue of activities includes something enormously worth doing which no hospital or specialist group can do so well? I believe it does; and I think the Academy should be less interested in its members' questionable right to do obstetrics or omphaloscopy and more interested in their qualifications for giving good personal care.

The point at which to call a halt in the process of erosion of general practice by specialists is the point at which the practitioner would no longer be in a position to do this vital part of his job.

FAMILY DOCTOR?

Now that many so-called general practitioners no longer do obstetrics, advise on babies, set fractures, sew up lacerations, test eyes, or prescribe for diabetics, their title is patently obsolete. Devised for an Act of Parliament, it was always chillily official; and now it is inaccurate. As a designation for what Stevenson called "the flower (such as it is) of our civilisation," G.P. is even worse.

Family doctor or family physician, with its friendly warmth, is much better. It suggests continuous care of parents and children over the generations ("I brought your mother into the world") and the experience of medicine and of life that this can give. But as a description of doctors who seldom look after whole families, and whose patients are always moving to another job in another town, it represents an aspiration rather than a fact. In England, in the three years 1948–50, 13% of the population moved from one local-authority area to another: and, as for the Americans, they are "almost a race of nomads"[22]: one person in five changes not only his home but his State of residence every year.[23] And even when they stay in one place, members of a family often have different doctors.

When an American family has young children, the person who often comes closer than anybody to being the family doctor is the pædiatrician; for in the United States, as in Russia, most pædiatricians do a kind of general practice among children, and relatively few are consultants.

PERSONAL DOCTOR?

The doctor we have in mind, then, is no longer a general practitioner, and by no means always a family practitioner. His essential characteristic, surely, is that he is looking after people as people and not as problems. He is what our grandfathers called "my medical attendant" or "my personal physician"; and his function is to meet what is really the primary medical need. A person in difficulties wants in the first place the help of another person on whom he can rely as a friend—someone with knowledge of what is feasible but also with good judgment on what is desirable in the particular circumstances, and an understanding of what the circumstances are. The more complex medicine becomes, the stronger are the reasons why everyone should have a personal doctor who will take continuous responsibility for him, and, knowing how he lives, will keep things in proportion—protecting him, if need be, from the zealous specialist.

Continuity of personal care is the ideal, though admittedly unrealisable unless both patients and doctors are willing to stay in one place. If there were a really good system of recording and documentation by which essential data were passed from one doctor to another, the fact that the doctor changes would matter less than formerly. Indeed Professor Rutstein points out that the disadvantages of personal discontinuity could be offset to some extent if everybody carried around a Lifetime Health Record[24]—which would undoubtedly be more reliable in some ways than the old doctor's memory.

Of course he is right—though in Britain most of us still think medical notekeeping by patients a morbid pursuit, to be discouraged. I know, too, that we must get used to a world in which ices no longer taste of cream, nor new potatoes of new potatoes; and in New York those ghastly plastic flowers seem to be commoner than real ones. But nobody is going to persuade me that a nice receptionist, some good notes, and an internist keeping office hours add up to a personal doctor who knows me and my home. Even if you throw in a psychiatric social worker, I still feel that I am being put off with a plastic substitute for the real thing. And I am supported in this belief by the knowledge that when personal medical care is abolished it is sooner or later reinvented.

21. Computed from Current Population Reports, series P-20, no. 98. Jan. 25, 1960.

22. Rappleye, W. C. Report on Dec. 1, 1959, as president of the Josiah Macy, Jr., Foundation, New York.

23. Wilson, D. America and the Welfare State. *Planning* (issued by P.E.P.) Jan. 25, 1960.

24. Rutstein, D. D. Lifetime Health Record. Harvard University Press, 1958.

Thus, even under the Soviet system, the Russian leaders have personal physicians.[25] It is the natural and sensible thing to do, and they can afford to do it. So should we.

THE PERSONAL DOCTOR

The personal doctor is of no use unless he is good enough to justify his independent status. If (like many unqualified healers) he has a therapeutic personality, that will be a great help; but in any case he needs to have the knowledge that comes of a continuing interest in medicine, together with trained and critical judgment.

DIAGNOSTICIAN

If he is to take responsibility he must feel that *he* is the patient's doctor: and he will never feel this unless he tries to make his own diagnoses—as fully as his facilities and time allow. Examination of patients is necessary because, as everybody knows, the fatal mistakes are made not through lack of knowledge but through lack of care. But my point is rather different. It is that the doctor who fails to examine and diagnose has lost his right to be an independent personal practitioner. Experience may well have made him skilful and very useful in dividing the serious from the trivial; but, if he does no more than this, he is working as a preliminary sorter or feeder for the hospital, and he may as well do it as a peripheral and junior member of the hospital staff. To be a personal doctor one must remain a real doctor, and not turn into the manager of a practice.

TEACHER

The personal doctor must also be a teacher, not only in showing people how to avoid disease but in showing them how to live with their disabilities—physical or mental. These things are not done at a single interview at a clinic. I was deeply impressed by an experienced pædiatrician in Wisconsin who said that when a mother is troubled about some deviation in her child, she may need reassurance not once but again and again. Nobody, he felt, could give such help as the physician who saw the children, year after year, well and ill, removing or at any rate sharing the parents' anxieties and burdens. And nobody else was so well placed to prevent those recognisable mistakes of upbringing that so often lead to emotional disaster.

PSYCHIATRIST?

On the topical question whether the personal doctor should train himself in psychotherapy, I shall say no more than this—he must allow people to talk. Often a patient and sympathetic hearing is all that is required to give someone insight and a fresh start. Yet doctors everywhere have become so busy that they commonly deny the patient what he wants most.

"No time," of course. To which the obvious retort of the simple-minded public is: "Why, then, do you say you have too many doctors already? Why not have more?"

DIVISION OF LABOUR

The public is right: there are too few doctors for the work to be done. Nevertheless there may sometimes be too many for the money available to pay them. Whereas Russia has met her medical needs by mass-producing doctors who are none too well qualified and worse paid, the profession in Britain intends to keep up its standards.

One alternative to having more doctors is to make better use of those we have—by giving them ancillaries to do everything the doctor need not do himself. The logical development of this is that the practitioner of the future will be the leader of a team in which nurse, receptionist, secretary, health visitor, and social worker relieve him of many things he used to do. Thinking in terms of a *general* practitioner, this solution seems sound; and certainly we want doctors of high quality whose skill is used economically and who make use of other people's skills. But if our object is to provide the right conditions for a *personal* doctor, we must beware of carrying this division of labour too far. If somebody else is to do all the small things for the patient, under the doctor's distant supervision, personal contact will be reduced to a minimum; and if this happens, the patient might just as well go to the hospital. Unquestionably the practitioner needs helpers in his surgery or office, and should be able to call on a wide range of skilled ancillaries outside; but the particular object of his independent existence may be defeated if he leaves all dressings to the nurse, sympathy to the receptionist, messages to the secretary, and the solution of home problems to the social worker. Organisation can be a menace to the personal care we are supposed to be organising.

Again, for personal care to be a reality, free choice is necessary, and there should be quite a few doctors to choose from.

I see that van der Wielen,[26] after a detailed study of practice in Holland, gives 2000 as the maximum number of patients that a doctor should have on his list; and if we are really to aim at good personal care—and stop the drift towards wholly hospital medicine—we shall have to think again about the number of doctors needed to give it. Is our country really incapable of using all the doctors it trains—or even of finding and training and paying more, of the same or a higher standard?

HOME OR HEALTH CENTRE?

Where should the personal doctor work? Ideally, I would say, he ought to work in his home—like his archetype, the genuine family doctor of yore. For establishing a lasting personal relationship there is nothing better than seeing the patient in his home or yours. But doctors, like other people, usually want to retain their wives; and if they are to do this, most of them will nowadays have to have their surgery, consulting-room, or office at a distance. Even so, it should not look like a shop, an office, an outpatient department, or a mortuary: it should look like an extension of the doctor's home. Some doctors could make their patients feel like personal friends if they received them inside a refrigerator, while others can make them feel like personal enemies in the warmest and most cheerful surroundings. But because human qualities can triumph over environment, it does not follow that a place that looks like the bathroom is as good for personal doctoring as one that looks like the master's study.

Agreement that what is wanted today is not a general practitioner but a *personal* practitioner could make a big difference to the kind of buildings from which doctors work. Many of us were reconciled or attracted to the National Health Service chiefly by the promise of a new deal for the practitioner, who was to have all the help he needed to do better work in better quarters—the health

25. Field, M. G. Patient and Doctor in Soviet Russia. Harvard University Press, 1958.

26. van der Wielen, Y. De Huisarts en de Doeltreffendheid van zijn Aandeel in de Gezondheidszorg. (The General Practitioner and the Effectiveness of his Share in the Care of Health.) Gezondheidsorganisatie T.N.O. Assen, 1960.

centre. Personally I thought that the kind of health centres then proposed would be a success, and I still regard the failure to experiment with more of them as inexcusable. But I now suspect that they were wrongly conceived.

There are, I have suggested, only two kinds of care—personal and specialist. The best place for the first is the doctor's home, or some equivalent of it, while the best place for the second is the hospital. For the health centre—a new kind of intermediate institution—I can see no function. If visited by specialists, it could be useful as an extension of the hospital; but as an extension of the doctor's home it is unconvincing. A building which looks like an institution, or is so large that it has to be organised like one, may be a good place for getting the benefits of modern science or civic aid, but it is not the place for finding one's *own doctor*. The skill of interior decorators, though it may make a modern medical centre quite charming, very seldom disguises the fact that the doctor's room is not his own. Three photographs of the children, and some pink-foot geese by Peter Scott, are Not Enough.

SOLO OR GROUP?

The doctor we all want to have looking after our families and ourselves is always at home and always ready to cope: he is never off duty and never on holiday. That is the patient's ideal; and such people do exist. A young practitioner in North Carolina complained that old Dr. J. had spoilt the neighbourhood: he had had no interest whatever outside medicine, and had always been cheerfully on call, day or night.

But, though we should like our doctor to be always on hand, we also want him to be a well-balanced man with a life of his own—not a tired obsessional. He must have leisure and recreation; and the only way in which he can get them and maintain a twenty-four-hour service is to have assistants, or partners, or colleagues who stand in for him. Though there are doctors who still prefer solo practice, the general tendency is towards association. Whereas before the start of the National Health Service, about half the practitioners were working singlehanded, the proportion now is less than a third.[27]

The group thus formed may do one of two things. It may do its utmost to preserve the personal relationship: though the patient may have to see a partner, he belongs very definitely to his own doctor. Or it may try to make him feel that he is the patient of the group rather than of any individual. Thus in an American practice a card for patients said:

> "To render good medical service on a 24-hour a day basis, we three general practitioners operate as a group practice. We would like for you to feel that you are a patient of all three physicians rather than any specific one and to feel free to consult any one of us about your health problems as they arise."

Where there are only three partners and they work together for years, there is admittedly a good chance that patients will establish a pretty strong personal relationship with all of them. But what happens when this group enlarges, or takes in members who do not stay? Wherever a partnership exceeds two or three, or ceases to observe the one-patient one-doctor rule, its feet are set on the slope that leads from personal medicine to group medicine; and the proper place for group medicine is the hospital.

27. Godber, G. E. *Lancet*, 1959, ii, 224.

In countries like England, where specialist services are well developed, all that the patient needs outside them is the care of an individual doctor. Formal or informal association with one or two others of his kind will help the personal doctor—not only because it gives him leisure, and a chance of doing some specialised work on the side, but because he can talk about his cases to his colleagues over coffee. But there is, I suggest, no functional advantage in having any larger or more complex group, which is liable to turn into some sort of "rootless" clinic.

SPECIAL INTERESTS?

An essential feature of the kind of small partnership I am advocating is that all its members shall be primarily personal doctors. It is thus entirely different from the "composite general practitioner" described by Nourse,[28] in which the functions of the old general practitioner are fulfilled jointly by (let us say) an internist, an obstetrician, a surgeon, and a pædiatrician working together. That resembles the Russian model for the countryside (except that the specialists are far better trained); and it is based, in Russia as in America, on the obvious fact that no one man is competent to undertake all kinds of practice at a modern level. But what may still be right for isolated places in the U.S.A. or U.S.S.R. is wrong for Britain, where nobody is very far from hospital. No longer needing truly general practitioners, we do not need their composite modern equivalent either. We need doctors with different, though equally important, terms of reference.

But though I believe that in Britain all specialised work should be done in, or under the auspices of, the hospital, this does not mean that no personal doctor should do any of it. On the contrary, it is necessary that the personal doctor with special interests should be able to follow them—partly because he must not feel unduly restricted in the practice of his profession but also because the two sides of medicine—personal and specialist—need to be linked by people who are engaged in both.

But there is a vital condition on which alone this should be done—namely, that the personal doctor who wants to practise any specialty must join the appropriate specialist team of a hospital. As personal doctor he is an independent practitioner, professionally the monarch of all he surveys; but in so far as he decides to be also a specialist he must accept the leadership of the whole-time specialist at the hospital. Under the National Health Service final responsibility in any specialty must rest on a consultant and not on a part-time specialist.

Taking the largest and fiercest bull by the horns, I say firmly that this rule applies to obstetrics. The delivery of infants is unquestionably part of general practice; but, as I have tried to show, general practice is dead or dying in this country. To my mind at least, obstetrics belongs to specialist medicine rather than personal medicine—to "episodic" medicine (in Dr. Iago Galdston's phrase) rather than "maintenance" medicine. Some might say, of course, that if the practitioner has to act as agent for a specialist when he looks after a woman in labour, he must equally act as agent for other specialists when he looks after a child with asthma or a man with angina. On this argument, if he loses his independent status in obstetrics he loses it in everything. But in real life, surely, there is a substantial difference between the two kinds of work. In his management of asthma or angina the doctor may need specialist advice, and in a crisis he may have to send

the patient to hospital. But nowadays he cannot properly practise obstetrics *at all* without a specialist organisation at his back; and, since it may have to cope with results, that organisation is entitled to lay down rules—e.g., about antenatal care. Hence there are particularly strong reasons, I would say, why the ultimate responsibility for all maternity work in an area should be borne by consultants. Many practitioners who are primarily personal doctors are extremely good at this work, and they should go on doing it; but if they deliver babies—whether at hospital or in the home—they should do so as members of the obstetrician's team.

The obstetric bull being now (I trust) removed from the arena, I come to a more general pronouncement—namely, that when a man in personal practice finds that his mind is really on a specialty, his move into hospital work should be made easy by opportunities to gain the needful qualifications. Though personal and specialist practice should be clearly distinguished, the difficulty that people nowadays have in transferring from one to the other is wrong. Our system is far too rigid.

RELATIONS WITH THE HOSPITAL

Outside the specialist services, the personal doctor is in full charge—responsible and independent. Only when we are sure that this independence will be recognised and safeguarded can we go on to consider the equally important *inter*dependence of the two kinds of medical care. Unless they are hand in glove, the patient must suffer.

COMMUNICATIONS

At the most elementary level is the obvious need for really good communications between personal and hospital doctors.[27 28]

Even in America, hospital reports and letters often come late: there are delays in dictating, and typing, and signing, and posting. One answer to this is that, since we have to live in the modern world, we should make more use of its convenient inventions. A big advance in medical civilisation would be made almost overnight if every hospital in this country followed the example of the Massachusetts General Hospital in urging housemen to use the telephone freely. Without regard to distance, they are encouraged to ring up the doctor if they want more facts when his patient is admitted, and always to inform him fully before the patient is discharged.

Equally, of course, the practitioner has a duty of communication, in which he too often fails—in America as here. Thus in nearly 60% of cases attending a university consultation centre no medical information was sent by the referring doctor.[29]

MEMBERSHIP OF STAFF

Provided they undertake to provide such information, all personal doctors should, I suggest, be made associate members of the staff of the hospitals with which they work. As such, they would have free access to any of their patients who are admitted, and on such visits their help would be regularly invited. They should be welcomed, too, on any ward round; they should have full use of the library; and there should be at least one comfortable room which they could regard as their home in the hospital and where they could meet their specialist colleagues. Already some hospitals try to serve as a kind of club for the doctors of the locality; and the gain, though intangible, is out of all proportion to the cost.

I see the associate members of a hospital staff as comparable to graduates who keep their names on the books of an Oxford or Cambridge college. They are not fellows, and they take no part in college government; but as members of the college they may have the right to dine in hall, and they are always received as people who " belong ".

" DEPARTMENTS " OF GENERAL PRACTICE

The American Academy of General Practice goes much further: it wants all large hospitals to have " departments of general practice " on a par with the departments of medicine or surgery. Except that it may sometimes look after the outpatients, such a department has no clinical service of its own; but it gives general practitioners a voice in hospital administration and opportunities to meet as a group intent on raising standards—by self-criticism and self-discipline.

The Academy is trying to preserve much of the old *general* practice, and the hospital has to allow members of these departments to practise general medicine, pædiatrics, obstetrics (" to include low forceps, episiotomy, cervical and perineal repair "), and surgery (" as it applies to the care of wounds and reduction of simple fractures ").[30] If they wish to go further in a specialty they must satisfy a credentials committee and will then be under the jurisdiction of the chief of the clinical service in which they work.

OFFICE AT THE HOSPITAL ?

A rather different but notable experiment is being made at the New England Medical Center in Boston, where three practitioners have been given an office in the hospital. They still have their private offices outside, but at the hospital they can see cases for which they might like specialist investigations or opinions. The object, Professor Proger [31] explains, is to combine the advantages of individual and group practice: in his own community the practitioner functions as an individual family doctor, while in the Medical Center he functions as a member of a group.

This scheme has much in common with the one at Hunterdon Hospital (see p. 746), to which all the local practitioners can bring their patients for examination and consultation. But in this Boston teaching hospital the purpose is more widely educational. Not only does the practitioner gain, but so do the students and interns. A student working in the family doctor's office " would be getting not outpatient work that imitated office practice, but actual *office practice* " and the scheme gives the hospital a chance to develop a home-care programme for students that " would *be* private practice in the patient's home ". Through the family-doctor unit, Dr. Proger hopes, medical practice in the area will be directly influenced by the standards of the teaching centre.

28. *Lancet*, 1959, ii, 219.
29. Williams, T. F., White, K. L., Andrews, L. P., Diamond, E., Greenberg, B. G., Hamrick, A. A., Hunter, E. A. Paper read at annual meeting of American Public Health Association, Oct. 19, 1959. Other interesting findings in this study were that about half the referrals were initiated by the patient rather than the doctor, and that over half the patients did not go back to see their doctor within the next month or two.
30. General Practice in Hospitals. Prepared by the commission on hospitals of the American Academy of General Practice, Volker Boulevard at Brookside, Kansas City, 12, Missouri, U.S.A. April, 1959.
31. Proger, S. (New England Center Hospital, Boston). Memorandum on the Family Doctor Unit in the Medical Center.

" GENERAL PRACTITIONER BEDS "

Like the American Academy of General Practice, I am sure that the personal doctor, when so inclined, should undertake specialist work—either in hospital or in a specialist service outside it (e.g., maternity). But the kind of associate membership of the staff that I want him to have would not entitle him to do this: he must also hold a specific appointment which attaches him to a hospital department for which a consultant is ultimately responsible.

The rule is plain and we must stick to it. Outside the hospital services the personal doctor is in charge: inside them he is an agent for the specialist.

Thus, if he is to look after patients in any kind of hospital bed, he should be appointed and paid for the purpose by the hospital. But I hope that, so far from being an exceptional arrangement, this will become very common. Hospital boards ought, I believe, to provide many more beds where practitioners can deliver their patients, and treat the less serious illnesses, under the auspices of a consultant. In the countryside these auspices might be rather remote; and usually the practitioner would use his own judgment. But I do not think that this would restore the abuses sometimes seen in cottage hospitals in the old days, and sometimes still seen in America. In doing this hospital work as an appointed member of the consultant's staff, the practitioner would have strong reason to seek advice, instructions, or other help whenever difficulties arose: indeed there would be good hope of the frequent consultation which can be so informative to both sides. Stallworthy [32] has lately made the excellent suggestion that practitioners should, in the same way, staff the hospital annexes to which patients should be transferred as soon as they can safely leave the ordinary wards.

American observers often say that the British practitioner's status as a doctor, and his morale, must have been damaged by depriving him (so often) of his hospital beds. Though the classical study of general practice in North Carolina [33] revealed no difference in the quality of care given by doctors with hospital associations and those without, I suspect that these American observers are right: to maintain their enthusiasm and their interest in medicine, some doctors require the stimulus of looking after illness in hospital, while almost all of them require the stimulus of frequent contact and conversation with colleagues. Though a proportion can get full professional satisfaction from purely personal medicine—and perhaps the proportion will grow—it is very important that anyone who feels the need of hospital work should get it readily.

HOME CARE

If very early discharge from hospital becomes the rule, the practitioner will be taking over some of the hospital's work—for which, indeed, it might properly pay him a fee. Even so, his patient's return home means that he must resume full responsibility, seeking hospital help only when he needs it.

But, though the hospital must be careful not to invade the personal doctor's territory, its special services should always be at his disposal. Where he is working as a peripheral member of a hospital department, as in obstetrics, he can of course command the help of his departmental colleagues, in the form of a flying squad if need be. But there are other aids to home treatment, such as the visiting pædiatric team,[34] which should have further trial, and at all times home consultations with specialists should be encouraged. These arrangements would go a long way to satisfy Dr. Bluestone's plea that the hospital should sustain the practitioner; but in Britain the hospital need not ordinarily supply him also with nurses or equipment or social workers or domestic helps. In this country these come from the health department.

RELATIONS WITH LOCAL AUTHORITIES

In the U.S.A., where private enterprise gets so much honour (and often deserves it), the public-health authorities have been very cautious about taking any part in curative medicine. Their attitude is slowly changing, under the leadership of such men as Dr. Herman E. Hilleboe, health commissioner of New York State, who says [35]:

". . . both preventing and ameliorating disease and disability is the business of everyone in medicine. . . . The function of a public health physician is to perform public health services that require organized community action. This may be preventive, diagnostic or therapeutic. . . . The function of a general practitioner is to perform any private health service that his patient needs. This, too, may be preventive, diagnostic or therapeutic. Both the private practitioner and the public health physician may perform these services directly or by referring the patient to another medical specialist.

" All this may seem like a rather simple way of straightening out a fallacious bit of reasoning which had as its faulty premise: Public health equals preventive medicine. The truth is, it has not been easy to clear up this misconception . . . what is emerging is a general recognition that a close partnership between public health physicians and general practitioners is vital to the welfare of the people in every community."

In Britain, happily, many medical officers of health have long cooperated with practitioners in providing personal services. Developments at Bristol under Prof. R. H. Parry were a notable early example.

That the personal doctor in this country can increasingly look to the health department for aid in his work is, I believe, a good thing because it counters any tendency of practitioners to think too much in terms of hospital medicine. On the one hand, because his patients so often need specialist help, and because contact with consultants and other colleagues is the best means of keeping medically alert and well informed, the practitioner should be much more closely associated with hospitals than is usual today. But, on the other hand, this association must not blind him to his own chief task, which is to look after people *outside* hospital—and keep them out of it when he properly can. Those practitioners who like to spend part of their time in hospital work should certainly do so; but it would be a great pity if many others did not prefer the work now done in public-health and school clinics, or take part in industrial medical services (though these, if Lord Taylor [36] has his way, will be under the wing of the hospital boards rather than of the local authorities).

Though, as already explained, I have lost faith in the kind of health centre we used to hope for, it did have the great merit of bringing the personal doctor into daily touch with people from the public-health department. The more closely they work together, the better for his patients.

32. Stallworthy, J. A. *Lancet*, Jan. 9, 1960, p. 103.
33. Peterson, O. L., Andrews, L. P., Spain, R. S., Greenberg, B. G. An Analytical Study of North Carolina General Practice 1953–54. *J. med. Educ.* 1956, **31**, no. 12.
34. Lightwood, R., Brimblecombe, F. S. W., Reinhold, J. D. L., Burnard, E. D., Davis, J. A. *Lancet*, 1957, i, 313.
35. *N.Y. St. gen. Pract. News*, March-April, 1959.
36. *Lancet*, 1959, i, 923.

SELECTION AND CONTINUING EDUCATION

The conclusion that henceforth we shall want personal doctors rather than general practitioners implies that many of our students ought to be selected for qualities other than (as Dr. Lester Evans put it) being good at chemistry at school. And whereas until recently our tendency on graduation day was to select the future specialists and let everybody else go into general practice, we might do better in future to select the future personal doctors and let everybody else be a specialist. Besides techniques, the personal doctor should have character, much knowledge, many interests, and, above all, a capacity for identifying himself with his patient. For, call it what you like, this is no easy role. Silver [12] well summarises its exigent requirements when he asks:

"Who will see the patient in the first instance and determine if the complaint is minor or major? Who will refer cases to the specialists for more complex and precise diagnosis or treatment? Who will collate the reports as they come in? Who will adjust the *precise* 'scientific' reports or findings to the patient, that imprecise person of infinite variability? Who will be so intimately related to the family as to know the interpersonal problems, assess them in relationship to the complaints or symptoms, and provide the support and guidance that probably does more to determine the duration or severity of an illness than the specific treatment? Who will carry on the day-to-day psychosomatic practice? Who?"

One professor spoke for many when he said: "Our educational system is producing experts, not doctors." But the doctor has to be an expert too.

UNDERGRADUATE EDUCATION

What kind of training is required by the man who wants to be both?

Dr. Proger says that in large towns the good family doctor is coming to be basically a well-trained internist.[31] And this is in line with the North Carolina finding [33] that the longer a man's training in internal medicine, the more likely he was to be a good doctor:

"The importance of training in internal medicine lies not in the name of the discipline or service but rather in the comprehensive viewpoint and emphasis on the basic techniques of diagnosis. These are the core of medical practice."

Comparing performance in the medical school with later performance in practice, the North Carolina investigators found evidence that a longer course in internal medicine makes up for lack of brilliance, turning some of the slower students into good physicians.

Since most of us hold that all doctors—whatever they are to do later—require a sound general training, I let myself in for a snub from a Boston professor when I asked what kind of training he provided for personal care. "Education", he replied, "should not be directed towards any special branch of medicine." But he agreed with me that it should not be directed *against* personal practice, as still too often happens. In point of fact, his school and others in Boston use their home-care programme very skilfully to give students a view of the world outside hospital [37]; and in New York Prof. Duncan Clark [38] and Prof. George Reader [39] told me about the ways in which their students make personal studies of families. Apart from this, in many American medical schools the student is introduced to personal practice by preceptors—practitioners who either take students in the outpatient department or have them in their homes and practices during the vacations for anything up to several months.

On the other hand, opinion is divided on the value of such schemes. Some medical schools do not really want to send so many students to study with practitioners or in peripheral hospitals, but they have to do it because their own hospitals (perhaps in a smallish town) do not yield enough experience. Though some preceptors are very good indeed, others are uninterested. In support of his scheme by which practitioners have offices in the teaching hospital, Dr. Proger's strongest argument, perhaps, is that "the student's familiarity with family medical practice becomes a part of his daily life" [31]: it is an integral part of the curriculum—not something stuck on to it.

POSTGRADUATE EDUCATION

But in medical education, Dr. Hilleboe said, the main problem has now shifted from the student to the intern and resident, and to the practitioner with his need to keep up to date.

Many American teachers feel that their medical schools must accept responsibility for the postgraduate, and they approve the idea by which university influence is supposed to permeate the National Health Service. But attempts by universities to give leadership in their localities encounter obstacles within as well as without: many of the staff, intent on research and teaching in their own departments, do not hold with universities assuming this external, social, role. In the Middle West the valuable work of universities in raising standards of agriculture is said to have made them sometimes too utilitarian: to use an ivory tower for silage can be a mistake in the long run. Nevertheless, for medicine, I am on the side of those who think of the doctor as a perpetual student for whose continuing education the medical school should provide.

The means whereby a university can spread knowledge and raise standards are the same in all countries. It may have a say in the appointment of staff, both senior and junior; it may lay down conditions on which students will be sent to preceptors, or interns to hospitals; it may hold lectures or courses at the periphery; or it may persuade practitioners to come to courses at the centre.

In courses at the periphery, I was told, practitioners are often reluctant to present cases and discuss them freely—fearing to lose face with their juniors or their fellows. (Dr. Rappleye thinks that, for this reason, an impersonal kind of teaching is best on the doctor's home ground.) They are much more forthcoming, however, when brought to the centre.

Wisconsin University has a magnificent new postgraduate teaching centre, used by, among others, the agricultural and medical faculties; and here a recent course for pædiatric practitioners was made successful by splitting them into groups of six or eight, under a "tutor". Not knowing, or being in competition with, the other members of their group, they felt really free to talk—and did.

Except perhaps in Russia, the difficulty about central postgraduate courses is to get hold of the people who might profit most. Though about 300 of Wisconsin's 3400 doctors attended one or more of the eleven courses last year, 100 were regular attenders and 50 almost addicts.

But courses are not what matter most. The American Academy of General Practice insists on its members attending them. Medical schools do well to spend time and trouble on making them both acceptable and valuable. And no doubt television will increase their range and

37. Hass, G. *Lancet*, 1958, ii, 442.
38. Clark, D. Family Study in a Health Center Clerkship. Address to annual meeting of the Teachers of Preventive Medicine, Nov. 11, 1956.
39. Merton, R. K., Reader, G. G., Kendall, P. L. The Student-Physician. Harvard University Press, 1957.

efficacy. But, for the doctor as for the student, it remains true that the best way of learning is by *doing*.

Dr. Proger is right when he says that the best kind of postgraduate medical education is the kind that is a part of one's daily work. Of the practitioners who have offices in his teaching hospital he wrote: " One would not need to be concerned about courses for the family doctors who were a part of the center. Their daily activities would constitute such a course; a continuing and permanent one." [31]

Though I should like to see his New England Medical Center experiment (and many others) tried in this country, I think it will end by orienting its doctors towards the hospital when they should be oriented towards the home. For my part I believe that if the personal doctor is to exist at all, the centre of his work must be geographically as well as philosophically distant from the hospital. But we cannot get away from the fact that the best—indeed the only—way of maintaining a reliable medical judgment is to be always discussing cases with hospital colleagues as well as fellow practitioners.

Like the young man in *If* who was to walk with kings nor lose the common touch, the personal doctor must talk to specialists while preserving his own holism. He may or not work part-time in the hospital, but he must be in and out of it. Postgraduate courses are no substitute. Even reading the journals, I fear, would not quite make up for lack of daily contact over patients.

Medicine (as someone said to me) should always be practised in a critical environment.

THE FUTURE

Both Dr. Iago Galdston and Dr. Lester Evans wisely tried to divert my thoughts from mechanisms to principles: we should, they said, be worrying less about methods of *organising* care and more about the *kind* of care likely to be wanted in future.

" Episodic " medicine in Galdston's view, is likely to decline (a new method of treating cancer might put most surgeons out of work); but " maintenance " medicine will still be needed. Other authorities pointed out that against the growing complexity and scope of specialist work (e.g., the extension of surgery if organ-grafting becomes feasible) must be set the simplification of many diagnostic and therapeutic tasks. This may make it easy for practitioners to detect and manage diseases now requiring a lot of work in hospital. " The Pap smear ", Professor Rutstein remarked, " is more reliable than physical examination."

Also looking ahead, Dr. Silver quoted A. N. Whitehead on the tendency of professional groups to take on new functions, deputing old ones to the group below. Thus the nurse and social worker, following their upward course, can relieve the practitioner of much of his old work, leaving him free to specialise as an internist in a group.

This is the argument behind Silver's experiments at the Montefiore Hospital, and it has far-reaching implications. If we accept Whitehead's professional upgrading as a law of Nature, we must conclude that in the future very few doctors will want to do anything that could be done by an ancillary, and we must abandon the concept of a personal doctor who likes looking after people and is therefore content to do menial things for them as well as clever ones.

But in a rational society natural processes would not necessarily continue unchecked; and we could decide that specialism in medicine is being carried too far. If we liked, we could now close our ears to what this journal called the siren song of the specialist—*Anything you can do I can do better*. For there is one very important thing that the specialist can seldom do as well—namely, look after people as people. As Prof. Nathan Smith said to me, " bringing specialist services to an area is one thing: taking care of people is quite another ".

Perhaps I am wrong, but I should guess that in the prevailing culture of the United States, the independent personal doctor is going to be specialised out of existence, and that within a few decades medical care will mostly be based on the hospitals. Those who would like to keep the best of the old system cannot hope for much support from a public which has got rid of small shops in favour of supermarkets, and which so often actually prefers the mass-produced substitute to the genuine article. One cannot rely on public instinct to choose the best; for in times of rapid change people often go astray over their real needs. The American suburban woman with her car is probably gratified that she can now do her day's or week's shopping with hardly a human contact, but she was more likely to keep healthy and happy in the old days of walking and gossiping. The up-to-date man or woman getting his medical care from an impersonal group instead of a personal doctor may unbeknown be losing even more.

In the words of Lester Evans, whatever happens in medicine the age-old demand of the person—the patient—for help has to be satisfied, by somebody. Somebody must listen to him: if not the doctor, then the priest, or the social worker, or the osteopath. In medical situations, the doctor is usually the helper to whom the patient turns first, and he therefore starts with a therapeutic advantage. But he loses it if he sees his task as merely the recognition of primarily dangerous disease, if he fails to accept his patient as a person, or even if he asks somebody else to cope with the personal side. In America I was told that people often favour small hospitals because they get T.L.C. This mysterious remedy turned out to be an old one—tender loving care. Very often it is what they chiefly want from their own doctor.

Much personal care can, as Professor Rutstein said, be given by the public-health nurse. Which is true enough. My point is that, unless the doctor gives it himself, no sufficient reason remains for his being an independent practitioner. Sooner or later he must be absorbed by the hospital service.

TWO KINDS OF DOCTOR?

Though I think we should retain and strengthen the personal doctor as residuary legatee of the general practitioner, I know that this belief will seem to some both backward-looking and impracticable. Dr. Hilleboe, for example, found it hard to conceive of two separate kinds of doctor, and he thought that a man concentrating on personal care would inevitably have a lower professional status which would deter able students from such a career.

If he meant that there should be one medical profession, not two, I am with him; and I would agree that in Britain the practitioner is already too far divided in practice from the specialist. Nevertheless I think that a division of some sort is functionally correct because it corresponds to the patient's two needs—a primary need for personal

care and a secondary need for specialist skills. Unless a division is preserved, the first of these needs will more and more go unfulfilled.

As for status, the personal doctor must make it very largely for himself. As the Royal Commission [40] has explained, in our changed society the doctor can very seldom enjoy the prestige that comes of being one of the few educated people in his neighbourhood; and nowadays his patients are less docile. Moreover, though the personal doctor should be paid as much as the average specialist, and exceptional performance (in this work as in the specialties) should be recognised financially and otherwise, he will seldom have a chance of the monetary and professional rewards that go to men who win a national or international reputation. He will have to be content with a small territory—often smaller than it is today—for nobody can give really personal care to a flock which is large or widely scattered. But think of the history of general practice, and its innumerable examples of a kind of prestige that the eminent consultant hardly ever gains. The deep regard of the people of a locality is at least as satisfying as the plaudits of a congress. And it takes at least as much earning.

Personal practice, admittedly, is scarcely worth attempting without a vocation for it. But possibly in future a growing proportion of the newly qualified will say: "I'm going to be—not a radiologist, not a surgeon, not a biochemist—but a *doctor*." That, after all, was the thought with which many of them entered medicine. And a doctor is what 90% of the patients (though they may not know it) really need.

CONDITIONS FOR INDEPENDENT PRACTICE

But if we are making a serious attempt to develop good personal care in this country, good recruits are only a beginning. We must offer them conditions in which the odds are in favour of their improving steadily, as doctors, throughout their years in practice. At present the odds are often, if not usually, against.

To be a good personal doctor, a man must really take care of his patients: he must make diagnoses and take decisions—not merely write little notes to specialists. To shoulder such responsibility safely, he must know both his limitations and a great deal of medicine. And the best way of learning these, and keeping up to date, is frequent conversation with the specially informed.

In the National Health Service the financial incentives are mainly against the doctor who wants to look after a reasonable number of people and do all he can for them. If we mean to encourage such doctors, these incentives should be reviewed and probably revised. But, after my American visit, I have a new consciousness also of the harm done under our system by keeping practitioner and specialist so far apart. I remain convinced of the personal doctor's need for autonomy, but I now think this compatible with the kind of day-to-day contact at hospital which can make his own work so much more interesting and efficient.

The virtue of independence is nullified by isolation. The practitioner's usefulness and professional status depend on his being well informed; and in the modern world close association with the hospital is therefore a condition of his professional survival.

Some ways of strengthening that association have been suggested above, but there are others. Though we may not follow the Americans in everything, let us at least adopt—or rather resume—their excellent habit of wide experiment.

40. Royal Commission on Doctors' and Dentists' Remuneration; p. 106. H.M. Stationery Office, 1960.

SUMMARY AND CONCLUSIONS

Except in isolated places, the general practitioner is already extinct.

In the Russian countryside, and in many American towns and villages, he has been replaced by a small group of doctors trained in different specialties—a "composite general practitioner".

But in Russian cities, and in some experimental American schemes, general practice as an independent activity disappears altogether. General medical care becomes one of the functions of a group which also gives specialist care.

Both in America and in Russia many such groups (clinics, policlinics, &c.) are still separate from hospitals. But the hospital is the natural centre for specialist work, and the groups will eventually be absorbed into the hospital organisation.

As medical centres for their area, the hospitals will then be offering full medical care. And if they do this satisfactorily there will be no place for the independent practitioner.

From the technical standpoint, this plan has obvious advantages. An internist, in easy consultation with other consultants and with beds at his disposal, can give the patient technically more than any independent practitioner. Hence the American public, already specialist-minded, may soon come to feel that hospital groups can best meet all its medical needs.

In our National Health Service such developments are impeded because the independent practitioner is protected, under an organisation separate from the hospitals. But his independence cannot be preserved indefinitely if his work could evidently be done better in a hospital milieu.

With the advance of specialisation, many of the functions of the independent practitioner have already been taken over by the hospital, and he will eventually be absorbed into the hospital system unless he is seen still to perform some important function for which independence is necessary.

The function which the good practitioner can in fact perform better than the best of hospital groups is personal medical care—looking after people as people. Whereas the specialist is, willy nilly, oriented towards the hospital, the independent doctor is well placed to think of people in their homes and workplaces, in health as well as in illness.

In these islands, with hospital specialists almost everywhere accessible, the general practitioner (composite or otherwise) is dead. But the personal doctor is needed more than ever.

Only if we clearly recognise his role can we set about fortifying him in it. To know what should be done for (and by) the independent practitioner, we must stop thinking about general practice and think instead about personal practice.

The change of name brings out better the importance of this part of medicine; for personal care is the primary medical need. But it also introduces a different criterion which displays different shortcomings and different ways of meeting them.

Looked at as "general", a practice may pass muster, or even appear good, if it ensures that serious illness is picked

out and sent to hospital; but if we examine its merits as a " personal " practice it may be plainly on quite the wrong lines. Thus in a general practice, as in a hospital, unhurried personal attention may seem no more than an amenity—something extra for which a charge might properly be made. But in a personal practice it is the sine-qua-non.

Similarly some of the ways in which we have sought to improve general practice may be wrong if personal practice becomes our aim.

Personal medicine is practised by individuals, not by groups; so the personal doctor must look after people personally. For treating people at home he should get whatever aid he needs from medical officer of health or hospital; but, though he must use ancillaries, the purpose of his existence may be defeated if he deputes too much work to other people.

Similarly it may be defeated if, inspired by efficiency experts, he seems to put his patient on anything resembling a production line. The hospital must be to some extent a factory, but the personal consulting-room must *not*.

In the patient's eyes, the ideal doctor practises from his own house and is on duty twenty-four hours a day. In real life the outside surgery or office, the partnership, and the duty roster are usually a necessity; but the surgery should be home-like and the partners preferably not more than one or two. The large partnership tends to become a group with a clinic.

The personal doctor who is keen on a specialty, or likes hospital practice, should have every chance to pursue it. But while he is actually engaged in such work—which for him is a sideline—he cannot claim his usual autonomy. He should do specialist work only as a member (internal or external) of a hospital department. If they can accept this condition, a great many practitioners should go on doing obstetrics, both inside and outside hospital, and far more than at present should look after beds—especially in small hospitals and hospital annexes.

Even if he holds no specialist appointment, the personal doctor should work as closely with hospitals and specialists as is possible without imperilling his independent and responsible status. Those who are willing to help hospitals by supplying proper information about patients should be made associate members of the hospital staff, with appropriate privileges.

To take care of patients as their personal doctor demands the continuous exercise of well-informed judgment; and for acquiring and maintaining such judgment no other form of postgraduate education can compare with frequent discussion of cases with colleagues.

Personal medicine is a vocation, and it may or may not still attract enough people capable of taking its responsibilities. But this much is clear. Whether in America or here, the independent practitioner, outside hospital, will survive as a personal doctor—or not at all.

Without specific action, it will be not at all.

In the United States I was the guest of the Milbank Memorial Fund, whose president, Dr. Frank G. Boudreau, is the most perceptive of all hosts. Some of the many other colleagues who helped me have been gratefully mentioned above; but I must particularly thank those who gave up whole days to my visit—notably Dr. George Silver, Dr. C. B. Esselstyn, Dr. Joseph Garland, Dr. Leslie Falk, Dr. Thomas Nichols, Dr. Henry T. Clark, and Dr. Nathan Smith—and also Dr. O. M. Peterson for his advice on where I should go. If those who entertained me should read this article, the thoughts of some of them may turn, I fear, to the Spartan boy who nourished a fox in his bosom. But this fox at least recognises his good fortune.

That I actually saw all the intended people (and one chipmunk) was through blindly following the detailed instructions of Miss Anne Donohue, of the Milbank Memorial Fund.

Special Articles

ROYAL COLLEGE OF SURGEONS OF ENGLAND

THE completion of another stage in the buildings planned for the college in Lincoln's Inn Fields was celebrated on Tuesday when new laboratories were formally opened. Guests were welcomed by the president, Sir James Paterson Ross, and heard about the rebuilding scheme from Sir Eric Riches, chairman of the building committee, and Mr. Alner W. Hall, the architect.

The new floors which were opened this week lie behind the original college and adjoin the premises provided by phase I of the building programme (which included the Great Hall, museums, and laboratories). Phase II was the Nuffield College of Surgical Sciences, which stands on the east side of the college; and the buildings now completed and in use form phase IIIA. The final phase, IIIB, now starting, will, by additions and alterations, accommodate departments of pharmacology and biochemistry and the Hunterian Museum.

Phase IIIa

On the ground floor a skilfully lighted and comfortable lecture-room has been named after Sir Cuthbert Wallace; and next to it there are a committee-room, named after Mr. W. R. Gibson, and a fellows' common-room, named after Sir John Bland-Sutton. Where the new corridor joins that leading to the Great Hall, a rotunda has been created, in which stands Weekes' statue of John Hunter, which when the original college building is restored to normal will be visible from the front door.

The first floor contains the department of dental science and the odontological museum, the only part of the college museum to escape the late war virtually undamaged.

The second floor completes the suite of research laboratories for the department of pathology.

The third floor includes the department of research in ophthalmology, formerly housed in one room in another part of the building. With this department is the Wernher Group for Research in Ophthalmological Genetics (a unit of the Medical Research Council). A demonstration room on this

floor is shared by the departments of physiology and pharmacology.

The fourth floor is for the department of anatomy and includes dissecting-room, demonstration room, and research laboratories. The upper floors are known as the Simon Marks Laboratories.

The College Appeal

The cost of completing the building programme is estimated at £350,000; and an additional annual income of £150,000 will be needed to support extensions of research and teaching. Considerable funds were raised from a private appeal to friends of the college, which helped to complete phase IIIA; but it was necessary to broaden the appeal if these further commitments were to be met. The college appeal committee, under the chairmanship of Lord Kindersley, launched this wide appeal, and a brochure describing the work of the college and the appeal may be had from the appeal secretary, Mr. W. F. Davis.

TRAINING OF NURSES

FOR some time the General Nursing Council have been concerned because some approved training-schools, where there is insufficient clinical experience, find it difficult to provide adequate training for their student nurses. These hospitals often have difficulties in recruitment and tend to accept girls whose standard of education is inadequate. This deteriorating situation can best be met, the Council believe, by reducing the number of training-schools and reintroducing a minimum educational standard of entry to training for student nurses.

The Council have accordingly revised their conditions of approval of hospitals as training-schools for admission to the general part of the Register:

A training-school may be made up of more than one hospital but it must have a minimum of 300 beds, with a daily average bed occupancy of not less than 240 beds. The school must be able to offer varied clinical experience in different departments. Special hospitals might thus suitably join general hospitals to form a training group, but the amalgamation of two or more small general hospitals to provide the minimum number of beds would not meet the new conditions of approval.

The new conditions of approval will inevitably affect the status of smaller hospitals at present approved as complete training schools, but the Council believe that most of these will be able to join a group school for general training or become training-schools for assistant nurses. The new conditions of approval will become effective at the beginning of 1964 for existing training-schools; new applications for approval would require to meet the new requirements.

The condition of a minimum educational standard for entrants to training, which has been in abeyance since 1939, will be reintroduced in July, 1962. The Council were anxious that it should apply to training for all parts of the Register, but the Minister of Health has so far only given his approval for the parts for general, sick children's, and fever nurses. At present he is not prepared to extend it to the parts for mental and mental-deficiency nurses.

The entrance test set by the Council has been devised by the National Institute of Industrial Psychology and is already used by many training-schools on a voluntary basis. It is in a form familiar to most schoolchildren, and it can be given and marked by training-school authorities at any convenient time. Exemption from this test will be given to candidates who hold the General Certificate of Education at ordinary level in two subjects (one of which must be English or Welsh language) and who show evidence of a satisfactory standard in five other subjects.

Though the annual intake of student nurses is 19,000 to 20,000, in a recent twelve-month period 8770 withdrew from training. An "appreciable proportion" of this wastage lay among educationally unsuitable students. Yet, as pupil assistant nurses, many might well have successfully completed their training and found the work interesting and satisfying. The number of pupil assistant nurses is only now reaching 6000, and the Council believe that it would be more satisfactory for the future of nursing if it were increased by several thousands, even though this meant a reduction in the number of student nurses. The title "assistant nurse" was sometimes said to be a deterrent to recruitment and the Council reaffirmed that they themselves would have no objection to the omission of the word "assistant", provided it was appreciated that this change did not imply a change in the conditions of training, and that the nurse would still work under the supervision of registered nurses or doctors.

The Widdicombe File

LIX.—SO-CALLED COLLAGEN DISEASES

MY DEAR DAVEY,

You encouraged me to put on paper—rather more clearly, you said—the message I was uttering the other night between the chicken and that ghastly ice.

I was talking about Klemperer and the group of diseases he has found himself fathering. And I exploited this metaphor in a way that I thought you would appreciate. But dinners are hopeless. However, I have now elaborated it a bit.

What I said was that it isn't always easy to see a likeness in the Klemperer family; and now and then he gives the impression of wanting to disown some of the progeny. But we know he was around at the time; and even if he didn't really have any fixed intentions he certainly had a good idea. It maybe wasn't a very clear idea, but it turned out to be a fertile one.

Then he retired from the village for a bit, and to his surprise the brood were adopted wholesale by the Physicians. Usually you pick an adoptee because you like the look of it; its baby eyes ask to be taken in to the comfort of your arms, and then you call it Rufus or some other pet name. The Physicians didn't really look the brood in the eye, it wasn't the babes that were taken in; and the adoption, like most adoptions of Pathologists' babies by Physicians, happened because the babes had a euphonious name. This is only so if the *g* is soft, and you'll find that the foster-parent Physicians show rapid and severe evidence of hypersensitivity if you refer to their precious bundles with a hard *g*.

Nobody knows (I said) what would have happened to the little innocents if Dr. K. had pondered a day or two longer about their name before he slipped off on vacation. If he had called them Collagenogenic, I'm willing to bet they would eventually have come under the institutional care of Pathologists Inc. (of whom Dr. K. is an ornament); and that philanthropic body would have tutored them, done its best to encourage the development of character in each, and even perhaps have given each of them a significant name. Pathologists Inc. have been hesitant to offer their help to Dr. K. in view of this gratuitous adoption by the Physicians of his brood; another very massive reason for hesitation is the difficulty of amassing *facts* about a conception that was artistic (scientifically) and novel, rather than a mere utilitarian termination of a long argy-bargy.

As a delicate first step to weaning the brood from their conservative fosterers, and perhaps reuniting them with Dr. K., Pathologists Inc. should, I suggested, make a definite statement on such knowledge as they have about

the Collagenogenic diseases. And here is the test I now propose to you for discussion:

This is a group of diseases of uncertain but possibly hypergergic origin, with focal lesions not always to be found by casual microscopists, these lesions being characterised by the escape from blood-vessels of substances that become deposited in or close to the vessels. These substances are of different chemical characters and in their deposited state have received a set of humorous names—amyloid, fibrinoid, fibrin, red stuff (which is sometimes correct enough), and L.E. substance (which is reasonably non-committal)—and in some cases at least, if time permits, these substances become changed in time to a substance that looks and stains very like collagen.

The correlation with the clinical picture, and suggested mechanisms for the toxic element, the anæmia, and the occasional response to steroid therapy may well be achieved once we have learnt to distinguish the brats from each other and to know which one we are talking about.

I do hope you're sufficiently interested to do something. Sorting out mixed-up families is the kind of thing Pathologists Inc. is, or should be, for.

Trusting the flame is lit,

Yours as ever,

J. A.

Conference

MENTAL HEALTH AT HOME AND ABROAD

THE annual conference of the National Association for Mental Health was held in London on March 24 and 25.

Future Role of the Hospital

Dr. H. F. OSMOND (Canada) described British and North American mental hospitals as generally grandiose, of weird design, costly to run, ill-equipped for their purpose, and without regard for human beings and human values. A patient from a small prairie farm entered what appeared to be a Gothic castle, from whose entrance hall —high, gloomy, and dimly lit—long flights of stairs rose upwards into darkness. The urge to impress had blotted out any other thought in the design of these buildings.

The small hospital, advocated by Kirkbride in 1850, had been discarded in the search for economy, and a descending spiral of overcrowding and degradation had followed. It was often said that mental hospitals should be home-like, but this implied that they were a permanent residence. The scale of a building must be appropriate to its function, which in this case was to prepare patients for return to their own homes. Without a clear idea of what the building was supposed to do, the architect could not plan a suitable structure. Yet he was often prevented from meeting the medical and nursing staff, and the needs of its potential users tended to linger in the background.

Hospital design must be related to our conceptions of the major mental illnesses—particularly schizophrenia, in which there appeared to be a disturbance of perceptual constancy. With a surging mass of impressions, identity was difficult to determine and nothing was certainly familiar. In such a case, there was no benefit to the patient from association with many people. If, however, he could learn to deal with three or four, life outside was possible; and he should leave hospital, perhaps for lodgings, which Carstairs had shown to be often the most suitable environment. The therapeutic-community principle overlooked the fact that reciprocal relationships were very rare among schizophrenics.

Architects, psychologists, psychiatrists and others must study the needs of patients together, examining such questions as who talked to whom at tables, whether patients preferred an area of their own however small, and what unpleasant perceptual effects might result from building patterns or ambiguity in any situation.

Dr. E. S. STERN regarded mental hospitals as the appropriate centre for the psychiatric services of a district, but their situation must then be urban and not remote. They should contain not more than 300 beds, in about twelve units.

In the past century, huge hospitals had been built in the belief that patients could thereby be treated more cheaply. The only meaningful cost was that per patient-illness, which, owing to the length of stay in most large hospitals, had made the intended economy in fact an extravagance.

Sex separation, among patients and nursing staff, should be ended; and individual cooking on each ward should enable men and women to play their appropriate domestic roles. To avoid family break-up, some or all of the close relatives might be admitted with the patient. A special training unit, which was neither a factory nor a sheltered workshop, would be required for rehabilitation; and a proper library was essential for the educational function of the mental hospital. At various stages of the illness, the environmental needs of patients varied; and, because of this, Dr. Stern also called for cooperation between architects and medical staff. Without it, any scheme would fail.

On the basis of past experience, he doubted the value of a large permanent increase in psychiatric beds at general hospitals. They tended to be in small units; hence there was a sense of hurry in treatment, and the transfer of long-stay patients meant that staff did not get a balanced view of psychiatric illness. It was difficult to introduce a suitable attitude in hospitals constructed for the treatment of somatic disease, and he felt that the patient would do best to enter at the start a unit where there was no time-limit to treatment.

Dr. Stern's suggestion that the mental hospital should have accommodation for disturbed children and adolescents provoked comment on behalf both of pædiatric hospitals and of local authorities.

As an architect, Prof. LLEWELLYN DAVIES stated that the design of the older mental hospitals bore no relationship to the care of patients. Those who had difficulty in relating space needed comprehensibility of layout around them. Yet mental hospitals tended to show repetition of identical spaces and radiating passageways, which gave no sense of identity in space.

Architects needed freedom to place the patient in different types of circumstances and to break down hospitals, but not into imitation private houses. Groups of small rooms should be related around living areas, like a cluster of collegiate buildings, and great attention must be paid to colour and light. Like Dr. Osmond, he called for joint research projects so that architects could be trained who would have a shared understanding with doctors of what happened in hospitals.

Community Care Services

Dr. T. A. LAMBO (Nigeria) emphasised that in Africa everything is based on the family unity, and traditionally treatment is given in the home. In Nigeria he had been

provided with a hospital which no-one wanted to enter. When the African patient was emotionally ill, the worst thing was to confront him with a new situation and new people.

He had therefore extended the therapeutic activities to four surrounding villages, many of whose inhabitants found work at the hospital. The villages had group activities such as dancing and story-telling, in which the patients joined. All patients came with a relative (which the extended family system readily provided) and were then referred to the head of one of the villages, who accommodated them in a suitable household. The relative accompanied the patient in all treatment activities, and, by caring for him made a large nursing staff unnecessary. Since the patient was already living in a normal community, rehabilitation was not required.

At first, patients had been very carefully selected, but all types were now dealt with except chronic degenerated schizophrenics. These do not seem to occur in Africa, suggesting that chronicity was environmental, rather than inherent in the illness.

Dr. ALAN MILLER (United States Public Health Service) emphasised the importance of further research to measure mental-health problems, their treatment, and the results. Certification laws varied widely between the individual States and many were undergoing change. In Idaho certification now involved responsibility for the care of the patient without the necessity for him to be admitted to an institution. Community mental-health projects depended largely on local initiative with State and Federal assistance to varying extents.

Dr. D. E. CULLINGTON suggested that our incomplete knowledge of the ætiology of mental illness did not mean that preventive measures were impossible, any more than they had been in the case of cholera. Environmental stresses might be reduced if, for instance, health visitors emphasised the importance of love and security in infancy.

In establishing hostels, local authorities should not make the same mistake as with mental hospitals, of creating large institutions. In some cases it might be better not to have directly run hostels, but to board out patients in privately run homes.

Caution in establishing hostels was also called for by Dr. D. H. CLARK. We should have a definite idea of the reason why patients were going to them, and not decant large numbers of crippled people out of hospital merely for a change of custody. As yet, the best provision for the mentally ill remained unknown.

Medicine and the Law

Overriding the Parents

ON Oct. 27, 1959, a juvenile magistrates' court made an adoption order in respect of a six-year-old boy, though the child's mother had withdrawn her consent and the father, who was in prison, had returned a form from prison saying that he wished to oppose the adoption and to be heard in the matter. The magistrates, in dispensing with the consent of both parents, apparently acted on no evidence, but only on a confidential report from the children's welfare officer. The parents were never told how the case was put against them; the father was only told on the day after the hearing that the order had been made. The father appealed.

Mr. Justice ROXBURGH said that he must allow the appeal in order that the standards of British justice should appear to all the world to be maintained.

The justices had made the order against the opposition of both parents, though the mother had vacillated throughout the proceedings for the painfully obvious reason that though she did not want to part with the child, she did not know how she could maintain him because of the low and intermittent earning capacity of the father.

Magistrates must realise that their power to dispense with the consent of the parents on a set of proved facts did not mean that they could do so on material which was not in evidence behind the back of the person charged. The purpose of the confidential reports in adoption cases was to satisfy magistrates that the adoption was for the benefit of the child, but this case showed how those reports could be abused. The Adoption Act, 1958, provided that magistrates could dispense with consent of the parents to an order if they were satisfied on specific grounds. That meant satisfied by evidence admissible in British courts of law, not upon secret reports.

Even if the father had a poor record and had stolen a television set, that was no reason for depriving him of one of his children on the strength of a report he had never seen and which was not in evidence. The magistrates knew that the father wanted to oppose the application and also knew that the mother, who was unrepresented by any legal adviser, wanted to oppose it. Their minds were thoroughly poisoned against the father by this secret report. Did his Lordship really have to tolerate a juvenile court condemning a man to lose his child on that sort of trial? The matter as regarded the mother was even worse. Not only was her consent never asked for, but she was before the magistrates opposing the application, and the grounds on which it was intended to deprive her of her child were never disclosed to her. The case would be sent back for retrial by a differently constituted bench.

In re E (An Infant)—*Chancery Division:* Roxburgh *J.* March 23, 1960. Counsel and solicitors: Mark Nesbitt (Claude Barker & Partners), N. C. H. Browne-Wilkinson (Church, Bruce, & Hawkes, Gravesend).

PHILIPPA PRICE
Barrister-at-Law.

The justices for the city of Liverpool refused to make an adoption order in respect of a boy aged 5.

The parents had originally given their consent to the adoption but subsequently withdrew it. The father said that his wife threatened to leave him if he agreed to the adoption, and the wife said that she wanted the boy back and had been persuaded to agree, at first, by her husband. The justices said that, though they considered the boy would be better off with the adopters, they could not say that the parents were withholding their consent unreasonably or that they had failed to discharge their obligations as parents.

The adopters appealed to the High Court and their appeal was dismissed.

Mr. Justice ROXBURGH said that it was a serious thing to take away people's lawful children and it was not to be done by hole-and-corner methods. The Adoption Act, 1958, did not allow it, nor would the moral sense of the community. His Lordship could think of few penalties more serious for a father and mother who wanted to keep their child than to take it away from them without their consent. He would have expected cases of that character to be conducted almost with the strictness of criminal trials.

Though counsel for the adoptors realised that it was for them to prove that the parents' consent ought to be dispensed with, the justices' clerk apparently thought it was for the parents to justify their refusal. After they had given evidence, when it was too late for them to defend themselves, the secret report of the children's welfare officer was read out. It was not

on oath. What could be more contrary to the principles of British justice than to read it out after they had given evidence? The adoptors gave no evidence and the justices, having retired, refused the adoption order.

The justices undoubtedly came to the right conclusion, but for the wrong reasons. They decided that the report showed no ground for dispensing with the parents' consent. The reasons they gave for their decision made it plain that, had the report been strong enough, they would have been quite pleased to have dispensed with the parents' consent on the material in the report. It was monstrous that these reports should be treated as evidence in a matter of this sort. They were not on oath and related to matters which were not even within the knowledge of the person making them. He would dismiss the appeal.

In re B (An Infant)—*Chancery Division:* Roxburgh J. March 24, 1960. J. A. Stannard (Edward Fail & Co., for Ronald Kay, Liverpool).

V. A. MOXON
Barrister-at-Law.

Income-tax of Part-time Consultants

Five consultants carrying on private practice and also holding National Health Service part-time hospital appointments, who have been selected by the British Medical Association as "test cases" for the 4700 specialists in comparable circumstances, appealed against assessments to income-tax on their remuneration from their hospital appointments (including fees for domiciliary visits and locum tenens appointments) under schedule E. They claimed that they should have been assessed in respect of such remuneration under schedule D.

The Special Commissioners for Income Tax found that a hospital appointment was an "office" within schedule E, but that as such appointment was a necessary part of the exercise of the profession of consultant and merely incidental thereto, the remuneration for the hospital appointment should be assessed as part of the earnings of the consultants' profession under the more generous provisions of schedule D. On appeal by the Crown, Mr. Justice Upjohn [1] held in favour of the Crown that the appointments were public offices and that profits therefrom must be assessed under schedule E and the expenses thereof deducted under the rules applicable to that schedule, while the profits and expenses of the private practice must be dealt with separately under schedule D.

The consultants appealed against this judgment and the Court of Appeal allowed the appeal.

Lord EVERSHED, Master of the Rolls, said that the first question was whether the consultant should be assessed for income-tax on the profits from his private patients and from his appointment entirely under schedule D, or—as the Crown contended—under schedule D on his private practice and under schedule E on his emoluments from his hospital appointment.

It was not disputed that all his profits from both sources arose from his one "job in life" as a consultant; and most people might ask "Why should it matter which?" The answer was that, despite the unity of the consultant's calling, the allowances and deductions which he could make under the two schedules differed, the standard of expenses being stricter under schedule E than under schedule D. The answer to that first question depended on whether the part-time hospital appointment was an "office" within section 156(2) of the Income Tax Act 1952. In his Lordship's view it was, and domiciliary visits and locum tenens appointments were part of the duties of that "office".

It followed that the Crown was right on the first question, and that persons like these consultants must for tax purposes have one essential part of their single calling severed from the rest, have each item of their expenses similarly dissected, and apply a different justification to each dissected part. That process was so artificial and formidable that it encouraged his Lordship to suggest that Parliament should now consider whether the distinction between the two schedules in the matter of deductions and allowances was justifiable.

The second question was whether the sums which the consultant might deduct for his schedule D assessment were limited to sums wholly and exclusively expended for his private practice, or whether he might deduct all expenses incurred for the purpose of his single calling of consultant, even though such expenditure related to his hospital appointment and could not be allowed for the purposes of his schedule E assessment. The answer turned on the word "profession" in section 137(*a*) of the Income Tax Act 1952, which the Crown said should be limited to that part of the profession relating to the private practice. In his Lordship's view the language of that section did not admit of such limitation in a case where the Commissioners had found that the taxpayer's "job in life", namely, his profession, was the single profession of a consultant. If that was in truth his profession, then sums in fact wholly and exclusively expended for the purpose of that profession were deductible from his schedule-D assessment, and none the less so because they might have been attributable to his hospital appointment and would not be allowed under Schedule E. In the result the appeal must be allowed.

Lord Justice PEARCE, concurring, said that in the frequent case where an "office" was found to be a necessary part of the exercise of a profession and merely incidental to it, there seemed to him nothing absurd in treating the expenses of that office as part of the expenses of the profession. It was more reasonable than notionally dividing half a profession that had been found to be one entity, producing an artificial allocation of expenses between the two halves, and then allowing the expenses of one half and disallowing those of the other.

Lord Justice HARMAN, also concurring, said that it was a notorious and long-standing injustice that the scale of allowances under schedule E were altogether more niggardly and restricted than those under schedule D. Indeed, it had been said that the pleasure of life depended nowadays on the schedule under which a man lived. The result in the present case could only follow in the special situation arising from the Commissioners' finding that only one profession was being followed, that the office was held merely as an incident of it, and that without it the whole profession could not in practice be carried on.

Leave to appeal to the House of Lords was granted to the Crown.

Mitchell and others *v.* Hirtenstein and others—*Court of Appeal:* (Lord Evershed, *M.R.*; Pearce and Harman, *L.JJ.*). March 24, 1960. Counsel and solicitors: F. Heyworth Talbot, Q.C., and John Creese (Hempsons); R. O. Wilberforce, Q.C., E. Blanshard Stamp, and Alan Orr (Solicitor, Inland Revenue).

M. M. HILL
Barrister-at-Law.

London Clinic's Appeal Successful

A private clinic sued the widow of a deceased patient for the balance of fees unpaid—£73—under a contract made with her to provide (inter alia) a skilled nursing service during her husband's stay in the clinic. By her defence the widow set out numerous complaints as breaches of the clinic's duty under the contract, which breaches she alleged had shortened her husband's expectation of life; and she counterclaimed for damages based on those same allegations. The trial judge dismissed her charges and counterclaim, and gave judgment for the clinic for the £73 claimed and costs. The widow appealed in person to the Court of Appeal. That court dismissed her appeal on her counterclaim but allowed her appeal on the clinic's claim [2] on the ground that the clinic

1. *Lancet*, 1959, ii, 180.

2. *ibid*, 1959, i, 1038.

had fallen short of the high standard required of an institution of its reputation and scale of charges (£5 5*s.* basic charge per day) and they held that the widow need not pay any part of the £73.

The court relied on three instances which they held to be shortcomings by the clinic relating to (i) a prescription wrongly entered on the patient's card; (ii) the failure of a nurse to check the nurses' report book against a doctor's prescription; and (iii) the provision of oxygen at the patient's bedside. The widow was awarded the costs of that part of her appeal.

The House of Lords allowed the clinic's appeal from those judgments, with costs.

Lord RADCLIFFE said that in view of the line taken by the Court of Appeal it was important to recognise the issues raised at the trial. The court had accepted the trial judge's finding that nothing done or omitted by the clinic had had any ill effect on the patient's physical condition; but they had held unanimously that the clinic could not recover any part of the outstanding balance of their charges. They had regarded themselves as dealing with a case of set-off for damages arising from a partial breach of the undertaking to provide a skilled nursing service. But that was not the set-off pleaded and it was difficult to see how, when there was no evidence, an appellate court could measure the value of the services actually given against the value of what the court regarded as the proper contractual standard.

On the first supposed breach relating to the prescription his Lordship could not find any lack of skilled service: nor did what had been done affect the patient in any way. On the second, though the nursing staff might have been in error, there was an unbridgeable gap between one instance of carelessness by the nursing staff (which had no effect on the patient) and such failure in the general standard of nursing care owing under the contract as would justify disallowing by way of damages a sum equal to some 13 days of full daily charges. On the third, the Court of Appeal seemed to think that the clinic was under a positive duty to have oxygen by the patient's bedside and to see that he got it whenever he was breathless, because that would have contributed to his comfort. Perhaps it would; but nothing in the evidence warranted saying that if oxygen was available outside a room and a patient had a bell, anything short of a high standard of nursing care was being shown.

The ground on which the widow's appeal had been allowed was not one which had been made an issue at the trial, and therefore to treat inadequacies of the nursing services as in themselves a breach of contract, even though no damage was caused to the patient's condition, was to make a new case for the widow. She had had no counsel to represent her before the Court of Appeal and it was natural that that court had tried to guide her case into what seemed the most favourable channel. But that course could not be taken without injustice to the clinic. The whole idea that one could treat continuous services such as had been supplied to the patient during five weeks as if they were goods or a commodity that had been sold, and so reduce the contract price by a set-off, was, to his Lordship, a strange one.

As to " damages ", even if his Lordship agreed with the Court of Appeal that there had been failure to observe an ascertainable standard of care, he would still not think that any consequences followed from them which could be called damages and set off against the fees contracted for. When a body such as a nursing-home or a hotel undertook to provide accommodation and attention of however high or luxurious a standard, it did not warrant that its internal organisation for providing them would not at any time or in any particular be involved in a mistake or would at all times do everything in the best possible way. So long as nothing was done or withheld that affected prejudicially the person to be served, he got what he, as the contracting party, stipulated for; and the defects, if such they were, in the internal organisation gave rise to no damages, because they did not touch him. The appeal must be allowed with costs and the trial judge's judgment restored. The situation was distressing and his Lordship regarded with dismay the position of the widow who must stand saddled with liability for a very heavy sum of costs. She had maintained this litigation under the settled conviction that her husband's sad death was contributed to by the clinic. The clinic, on the other hand, small as was the sum involved, had had to recognise that the charges she had made were highly prejudicial to their professional status and the skill and competence of their nursing staff. They could not be blamed if they had carried the adverse judgment of the Court of Appeal to the highest court. The other members of the House concurred.

London Clinic Trustees *v.* Hoare—*House of Lords:* Lord Radcliffe, Lord Goddard, Lord Tucker, Lord Cohen, and Lord Morris of Borth-y-Gest. March 24, 1960. Counsel and solicitors: Roger Ormrod, Q.C., and Michael Parker (Layton & Co.); Lady Hoare in person.

M. M. HILL
Barrister-at-Law.

Parliament

QUESTION TIME

Strontium 90 in Bones of Children

Mr. FRANK ALLAUN asked the Minister of Health if he would make a statement on the latest Harwell report showing the approximate doubling, within six months, of the strontium 90 found in British children's bones.—Mr. DEREK WALKER-SMITH replied that the increases reflected the increased rate of fallout deposition in the six months following heavy nuclear weapon testing in northern latitudes in 1958. There had been no test explosions other than the recent French test since November, 1958, and levels of fallout in this country had fallen substantially since June, 1959. The Medical Research Council had kept the matter under constant review and was preparing a further report.

Mr. ALLAUN: Is not the increase likely to continue, particularly in children born after June, 1959? Secondly, is it possible that some scientists may be mistaken about the safe level or the danger level, just as they were about X rays?—Mr. WALKER-SMITH: Provided that no further quantities are injected into the stratosphere, it is unlikely that the level of strontium 90 in children's bones will rise much above its present level, and subsequently it will probably fall. The reply to the second part of the question is " No "—no mistake. This is a field in which knowledge is fast developing, and, therefore, we look forward to a new assessment by the Medical Research Council.

The French Bomb

Mr. WALKER-SMITH said that fission products believed to be due to the French atomic explosion were detected in air in the United Kingdom in the period Feb. 27 to March 1 and in rain on Feb. 29. The total radioactivity from fission products during this period of four days reached about twice that still being recorded from earlier nuclear explosions but was less than 1% of the normal amount of natural radioactivity in air. The total radioactivity from fission products in rain on Feb. 29 was about twice that from fission products present on the average from earlier nuclear tests, but less than a tenth of the total a year ago. The small increase in radioactivity over this short period was due mostly to short-lived radioactivity, and only very small amounts of the long-lived isotopes, such as strontium 90 and cæsium 137, were present.

Overriding the Parents

Dr. DONALD JOHNSON asked the Minister whether, in view of the breach of the long-established precedent that parents should be responsible for their children in all decisions concerning medical treatment which was involved in the action of the Sheffield Regional Board in establishing special juvenile

courts in hospitals with powers to transfer responsibility to local authorities if parents refused permission for an operation on a child, he would request the board to postpone invitations to magistrates to set up such courts until the matter had been discussed on a national basis; and whether he would issue a whitepaper with a view to promoting such discussion.—Mr. WALKER-SMITH replied: Whether the provisions of the Children and Young Persons Act, 1933, would apply to a case of this kind, and what would be the effect of any order made under them, are questions of law on which it would not be appropriate for me to express any opinion. Accordingly, I would not feel justified in intervening, and see no reason to issue a whitepaper on the subject.

Dr. JOHNSON: May I ask my right hon. and learned Friend, however, what advice he has given to this regional hospital board in regard to section 102 (1) of this Act, whereby parents are allowed an appeal to quarter sessions in a case such as this, and whether or not, in his opinion, that does not completely invalidate the procedure the board project in these circumstances, and, accordingly, indicate that fresh amending legislation, or legislation, is necessary for anything of this nature?—Mr. WALKER-SMITH: No. I am sure that the regional hospital board is aware of the provisions of section 102 in regard to appeals. The regional hospital board is not seeking the use of any new powers in this context but merely trying to ensure that where the existing procedure is applicable it should operate speedily.

W.H.O. Malaria Eradication Fund

Mr. L. A. PAVITT asked the Minister what reply was given by Her Majesty's Government to the request of the World Health Organisation for a contribution to its special malaria eradication fund.—Mr. WALKER-SMITH replied: H.M. Government regretted that they did not feel able to make any further contribution to malaria eradication work additional to that which they already make by way of their contributions to the regular budgets of the World Health Organisation and to the United Nations Children's Fund and the Expanded Programme of Technical Assistance, as well as by way of the antimalaria work undertaken in Her Majesty's territories overseas. Mr. PAVITT: Whilst appreciating the Minister's regret, in view of the fact that there are some 250 million potential victims of malaria, will he think further on the question of responding to this special appeal?—Mr. WALKER-SMITH: We do not think that voluntary special ad-hoc funds are a sound way of financing continuing programmes of international organisations which have a regular budget. We feel that such activities should be part of a coordinated programme within a regular budget drawn up with predetermined priorities.

Care of Children's Teeth

On March 24, in the House of Lords, Lord TEVIOT asked H.M. Government whether, in view of the unsatisfactory condition of our children's teeth, they would consider favourably supplying without charge a mug and toothbrush to all national schoolchildren.—Lord ST. OSWALD replied: The proposal seems to imply that the provision of Government toothbrushes and Government toothmugs would produce a dramatic improvement in the teeth of the children of this country and that the unsatisfactory state of children's teeth today is mainly caused by their failure to use these implements. Neither of these premises stands up to serious examination. The chief cause of dental decay in children is the large quantities of sweets and biscuits munched between meals. Moreover the provision of mugs and toothbrushes would have little purpose without supervision of their use, and this would inflict a serious problem of organisation upon teachers which the Government do not think they should, or should be asked to, undertake. Both the provision of equipment and supervision of its use is more properly, more conveniently, and more effectively left as a parental responsibility. The whole problem of the care of teeth is under review by the Standing Advisory Committee on Dental Health Education, and the Government would prefer to await any recommendations by that committee before coming to any decision.

In England Now

A Running Commentary by Peripatetic Correspondents

IN interviewing a succession of dailies over the past twelve years—put together they would make a good-sized Monday morning surgery—I have noticed a commonly recurring factor: either they were already on my husband's list and declared undying faith, or oddly enough they were just about to "change doctors".

The reason for changing doctors was often given before the reasons for changing employment, and I was regaled with indignant talk of how "He only just looked at me—didn't even examine me . . ." Too inveterate an employer to be thus decoyed, and metaphorically feeling my husband's steely eye (not to mention the G.M.C.'s collective organ) fixed upon me, I hastily parry this with "But, ah, doctors *know*. . . . The sixth sense, and all that!" Or, if the daily is actually upright, on two feet, and appears at all sound in mind, sight, and hearing (I have had all kinds) I refer happily to her obvious robust health, and if necessary that of her attendant offspring, as a tribute and monument to her ex-doctor's skill and care.

But in quieter moments I have reflected on this, and the patient in me rears its ugly head. Perhaps one could expect a little examination—just a very short one. Of course I know all about clinical intuition and skill, years of practice, and so on, but after years of cake-making, I still prefer to use the scales or a well-tried spoon.

In my youth there was a strict, but much loved, family doctor, both wily and wise, who had a wonderfully brief but effective technique. Whatever the complaint he would smartly pull down the lower lid and give a penetrating scowl at the conjunctiva. Poets have written of eyes speaking volumes. Those eyes were a complete encyclopædia of diagnosis. The beauty of this simple technique was in its speed, absence of instruments, and satisfying mystique. I have heard his patients say: "He just looked into my eyes and pulled down the lid and he could tell at once. . . ." This, usually accompanied by some illustrative action which could be witnessed by a sympathetic audience, was most effective. The resultant sputnik-like orb, with a gory or fish-like crescent beneath, always convinced sceptics that So-and-So had had a fair hearing.

It might even have actually indicated something.

There are fewer cleaners among our patients now. Not because we now deal with a higher social strata. There are just fewer cleaners.

* * *

Someone had been to see a film about lemmings, those odd Scandinavian rodents which at irregular intervals proceed in countless numbers along a straight line until they reach the North Sea into which they plunge and are drowned. We asked the reason why. There are, it seems, several rather shaky schools of thought. One maintains that the lemmings' built-in migratory compasses are off the beam; another, sponsored by the *Encyclopædia Britannica*, holds that the lemming is a slave to habits acquired when the North Sea was dry land; and a third that they are used to swimming rivers and mistake the sea for one. This was too much for the departmental cynic. "The one-more-river-to-cross school, I suppose," he said. "If you ask me," he added, "the answer's a lemming."

* * *

I seem to have an extraordinary capacity for doing things at exactly the wrong time. Like exams, for example. No sooner have I passed the thing than the examining board feel there's no point in holding it any longer and *abolish* it, as they did the London M.D. part I after I had passed with much trouble and expense. I'd meant to take it a year or two before, and, had I done so, I would now probably be a real proper doctor; but as it is, what with the thesis they've started now, I'm back to square 1. On the occasions when they haven't abolished the exam on my behalf, they've raised the fees as soon as my name is noted in the list of candidates. The worst example of

such victimisation was the time they put the registration fee up from 3 guineas, was it, to about 11!

I'm no luckier with my science. No sooner do I thoroughly master some technique than it goes out of fashion. Like pneumothorax. I spent long hours pumping air in and sucking it out with those little machines that pop up and down or else with those great big ones that leak dirty water. Now I can't any more. Drugs go off the market as soon as I've learnt the dose—apart from digitalis which seems about the only one to accompany me faithfully on the road of clinical progress. Changing, in despair, to psychiatry from medicine I find myself even more at the mercy of the veering winds of fashion. I learned all about insulin coma just before it died, and I seriously wonder, with all these new drugs about, how long I shall be giving E.C.T.

Still, maybe someday they will all come back and my long-lost skill will place me at forefront. And I must say that whoever is Behind it All has not acted entirely with malevolence. I just got in before that confounded preregistration year.

* * *

The man in dungarees who entered the casualty department was asked why he had come. "I've got the gravel," he replied. He was asked to wait behind the screen in a cubicle. Five minutes later a casualty dresser went in to get the history. "What is this you were saying about gravel?" "It's in my lorry outside. Where am I supposed to put it?"

* * *

"Why are all those people called patients, daddy?"
"Er, well I don't know really."
"Mummy says it's because they have to wait out there so long."
"Oh."
"What's G.P. mean?"
"General practitioner."
"What's that?"
"Well, someone who practises medicine."
"How long have you been practising, daddy?"
"Oh, about five years now."
"I suppose when you start doing it properly they won't be patients any more."

* * *

The fracture clinic was grinding its way steadily through the waiting patients, with every chair and bench occupied. A figure strolling along the corridor to the X-ray department was vaguely recognised by one of the staff, partly by the arm which he had slung under his sweater. "Have you been sent back for another film?" asked the radiographer. "No," replied the patient. "How long have you been waiting since you were X-rayed?" was the next question, to which the patient replied "Nearly a day. I'm hoping to be able to find somewhere to sit down."

* * *

The Paranoid's Prayer—Lord, let what I think be what I think I think.

* * *

SPRINGTIME SAPPHIC

Twenty years have flown since the swallows nesting
High on stable beam in the April sunshine,
Fought and won the right to inherit next year
Back in our homeland.

Twenty years have flown since the Spitfires curving
High in Kentish skies for the same brave question,
Who shall fly on? Who to the garden diving?
Back in our homeland.

Twenty years now gleam on the rockets pointing
High in English skies, with their radar pulses
Questing still for hope of a peaceful echo
Back in our homeland.

Letters to the Editor

CHILDREN IN POINTED SHOES

SIR,—The matter of foot defects in children caused by unsuitable footwear was the subject of a question in the House of Commons on Feb. 1, and it has been discussed in medical journals [1 3] recently.

It seems to me fundamental in such a discussion to distinguish between abnormalities of the structure of the foot and disorders of the function of the foot (whether or not associated with deformity). One must decide to what extent abnormalities of structure (e.g., hallux valgus) are attributable to the external pressure of an unsuitable shoe; to what extent unsuitable shoes produce disorders of function; and to what extent, if any, disorders of function may cause abnormalities of the structure of the growing foot.

If hallux valgus is due merely to the intermittent external pressure of a shoe why do we find the regular wearing of a "hallux-valgus night-splint" so ineffective in reversing the deformity even when well-designed shoes are worn; why is the deformity sometimes entirely unilateral; why does the incidence of hallux valgus begin to increase with age more rapidly in girls than in boys even before the age of nine years (i.e., at a period of life when girls and boys wear similar shoes); why does it occur at all—however seldom—in people who never wear shoes?

If there is a poor case for insisting that hallux valgus is produced by the intermittent external pressure of a pointed shoe there is a good case for stating that unsuitable footwear, by restricting the normal movements of the foot, is a source of disability. If we consider only the adolescent female it is the "casual" rather than the shoe with the high heel and pointed toe which is a common source of trouble. A normal heel-toe gait is hardly possible in a loose-fitting "casual" and it is certainly impossible to run properly when wearing such shoes. This type of footwear is kept on by clawing the toes and by a shuffling gait. The foot does not function properly and symptoms of foot strain develop. In clinical work one commonly sees adolescent females with such symptoms attributable to such a source.

To what extent disorders of function can lead to deformities of the foot is a difficult problem worth more consideration. In this regard it is worth mentioning some results of a comparison of foot forms among the non-shoe-wearing and shoe-wearing Chinese population of Hong Kong.[4]

This survey showed a 33% incidence of hallux valgus among the shod as compared with a 1·9% incidence among the unshod. It also showed, however, that metatarsus atavicus, metatarsus latus, metatarsus primus varus, and hypermobility of the metatarsus all occurred much more frequently among the unshod, the figures being respectively 16·8:7, 38·3:7, 24·3:6, 13·1:0·9. Now, the unshod were chosen entirely from the fishing population who live aboard their boats and who use the hallux and forefoot to hold fishing nets and lines taut. It seems evident that the high incidence of splaying and hypermobility of the metatarsus in these people is an expression of function. Is the low incidence of hallux valgus among the unshod not, therefore, an expression of function and the high incidence of this condition among the shod a sequel of dysfunction and not a product merely of external pressure? (To judge from photographs of them, some of the shoes worn did not in fact exert pressure on the hallux.)

The point I wish to emphasise is that if our criticism of children's footwear is to be heeded it must be made for the right reasons. There is an arguable case for insisting

1. *Brit. med. J.* 1960, i, 488.
2. *Lancet*, 1960, i, 552.
3. *ibid.* p. 598.
4. *J. Bone Jt Surg.* 1958, **40A**, 1061.

on better designs of footwear to allow children's feet to function properly but to insist that shoes merely by external pressure produce deformities is not a sound argument.

Lincoln. DAVID F. THOMAS.

SIR,—Many of my friends, both male and female, wear and are proud of shoes that bear no resemblance whatever in shape to the feet inside them. Do these shoes not have an effect upon the feet that wear them?

My recent experience of nursing in a mental hospital would lead me to believe that much of the old patients' foot troubles are due to a long term of cobbling on " shoe strings ", with footwear that fits where it touches.

London, W.5. KAY MOTTRAM.

FLUORIDATION AND GASTRIC CANCER

SIR,—As no figures are given it is not possible to say whether the disparity noted by Dr. Burrowes (March 26) between the mortality for gastric cancer in two small Lincolnshire towns might have arisen as the result of a chance fluctuation affecting populations of this size. Assuming, however, that this difference is a " real " one, available evidence would not support the suggestion that the difference could be related to the difference in the fluoride content of the water-supplies concerned.

The highest mortality-rates from gastric cancer in this country are to be found in North and West Wales where, so far as I know, no water-supply has ever been reported as containing more than a trace of fluoride. West Hartlepools and South Shields have both had in the past appreciable amounts of fluoride in their supplies (approximately 2·5 and 1·4 p.p.m. respectively). Both are county boroughs. The data on which the following table is based can be extracted from the area mortality report of the 1951 census.[1] Two neighbouring county boroughs on the North-East coast (Sunderland and Tynemouth) with fluoride-free water-supplies have been chosen for comparison. The standardised mortality-rate (S.M.R.) is the ratio (expressed as a percentage) of the number of deaths observed in the area to the number that would be expected to occur if the age-specific mortality-rates for England and Wales had applied to the local population. The standard error of the S.M.R. may be taken as the S.M.R. divided by the square root of the number of deaths involved. The period covered is the four years 1950–53.

	Gastric Cancer S.M.R. (England and Wales = 100)		
	Male	*Female*	*Both sexes*
South Shields	145 ± 16·9	159 ± 21·6	151 ± 13·3
Sunderland	161 ± 14·7	134 ± 14·1	149 ± 10·3
Tynemouth	119 ± 17·4	138 ± 23·8	127 ± 14·1
West Hartlepools	127 ± 18·3	114 ± 19·3	121 ± 13·3
Fluoride areas	138 ± 12·5	141 ± 13·4	139 ± 9·6
Non-fluoride areas ..	149 ± 11·5	135 ± 12·1	143 ± 8·4

All four county boroughs have higher than average mortalities when compared with England and Wales, but there is nothing in these figures to suggest that the area mortalities differ significantly among themselves with respect to the fluoride content of their water-supplies.

Curious local differences in the mortality from gastric cancer similar to that noted by Dr. Burrowes have been observed elsewhere in this country and in Holland.[2] Stocks and Davies [3] have recently been investigating an almost comparable situation affecting two neighbouring towns in Devon. It seems likely that such differences may turn out to be related to differences in either the trace-element content or the organic content of local soils.[4]

Anglesey. G. WYNNE GRIFFITH.

FLUORIDATION

SIR,—Though I was glad to see your survey of the fluoridation position I was sorry to find that it restricted itself to one minor aspect of this much vexed question—dental caries in children. It is evident that the point of my letter in *The Sunday Times* [5] was misunderstood. My intention was to refer, not to an " optimum fluoride level of 1·2 p.p.m. for caries control ", but to levels of 2 p.p.m. upwards, at which the graphs both of Dean [6] and Forrest [7] show the caries experience at a minimum. The minimum for Forrest's graph is shown actually at 3·5 p.p.m. at which level objectionable fluorosis would certainly occur. It follows that the levels of 1 or 1·2 p.p.m. commonly referred to as " optimal " for caries control are in fact " maximal " for the avoidance of a toxic symptom, and even so, it is not possible completely to separate any useful degree of caries control by fluoride in the drinking water from some degree of mottling, however mild at the lower levels.

The point is made, not in connection with teeth, but to contest the impression which is being given to the public by medical officers and others, that fluorides, though admittedly poisonous in big doses, change their nature at the low levels contemplated for fluoridation, and become " beneficial " substances, sometimes even stated to be essential nutrients for the living cell. This is quite unjustifiable. The only proven effect which may be called " beneficial " is that upon a non-living material, the dental enamel. When this is obtained by topical application I understand that no mottling occurs even with a 2% solution. When it is obtained by drinking the water it is accompanied by some degree of dental fluorosis, which has hitherto been accepted as the most sensitive sign of chronic low-grade poisoning (e.g., see Hodge and Smith [8]). This provides no basis at all for risking the health of large numbers of people on a mere speculation that there is a critical level below which the fluoride ion loses its toxic character and becomes physiologically beneficial. When, further, we learn from such a high authority as Prof. Hugo Theorell [9] that, far from losing its activity as an enzyme-inhibitor at low levels, the fluoride ion can inhibit lipase at 1 part in 5 million, it becomes most extraordinary that the fluoridation discussion should always centre on the dental caries aspect rather than on the desirability of increasing permanently the general intake of a substance having these biochemical properties.

Fluorides are common, toxic pollutants of air, water, and vegetation. The eighth symposium of the Institute of Biology, recently published,[10] deals with the effects of pollution on living material, and confirms the view that the effects of toxic pollution become recognisable only at high levels, when such crude phenomena as wholesale destruction of fish, crippling fluorosis in cattle, radiation sickness, or the deaths of thousands of Londoners during the 1952 smog, draw attention to the dangers. At lower levels there can be no direct evidence unless experimentation is carried out on an impossibly massive scale. In the absence of such experimentation there must remain a strong presumption in favour of reducing, and above all against deliberately raising, the level of pollution with any toxic substance, especially in an essential of life such as the drinking water of large populations. In the case of fluoride

1. Registrar General's Decennial Supplement, England and Wales, 1951: area mortality. H.M. Stationery Office.
2. Diehl, J. C., Tromp, S. W. Geographical Distribution of Carcinoma in the Netherlands; vol. 2. Oegstoeest, 1955.
3. Stocks, P., Davies, R. I. (in the press).
4. Stocks, P. British Empire Cancer Campaign Annual Report, 1957; suppl. 2, part 2.
5. *Sunday Times*, Feb. 7, 1960.
6. Dean, H. T., Arnold, F. A., Jr., Elvove, E. *Publ. Hlth Rep., Wash.* 1942, **57**, 1115.
7. Forrest, Jean R. *Brit. dent. J.* 1956, **100**, 199.
8. Hodge, H. C., Smith, F. A. *in* Fluoridation as a Public Health Measure; p. 80. Washington, 1954.
9. Communication to the Royal Swedish Medical Board, Stockholm, March 1, 1958.
10. Symposia of the Institute of Biology, no. 8. Edited by W. B. Yapp. London, 1959.

the circumstantial evidence that it remains potentially toxic at very low levels is even stronger than with other dangerous pollutants such as radioactive substances.

Your survey ends with the view that it is clinical judgment that counts, but here I must beg to differ. By abandoning individual treatment in which they are trained, and launching themselves into the mass-dosing of large populations—a field familiar enough to the plant and animal pathologist, but, I submit, entirely new to the experience, as well as the ethics, of medicine—the medical and dental professions are abandoning also the clinical basis of judgment, and committing themselves to statistics. Obviously, the larger the population subjected to treatment, the more is this true, and the less significance can be attached to the necessarily limited numbers of individuals who can be clinically examined with a view to the particular hazard in question.

I have drawn attention elsewhere [11] to the gross statistical inadequacy of the evidence adduced for the harmlessness of fluorides at fluoridation levels, which is far less adequate even than that adduced for their effectiveness in caries control, but the point has been evaded. There seems to be little realisation among those who favour this measure that the numerical relationships involved in population-treatment are widely different from those involved in the ordinary practice of medicine or dentistry where risks of the order of 1 in 10,000 or 100,000 need scarcely be considered when a highly probable benefit is in prospect. Yet to impose such risks upon the entire population of a large town, let alone a nation, would be almost certainly to inflict injury or death of a statistical order comparable to that inflicted, for instance, by poliomyelitis; with the difference, however, that the effect would be obscured by the multiplicity of other causes operating, and unlikely to be detected either clinically or statistically.

Surely such a risk cannot be imposed on a basis of mere speculative opinion! The very least that critics of fluoridation are entitled to is an accurate estimate of the lowest significant differences both in mortality and morbidity which can be shown by the evidence which is alleged to show the harmlessness of fluoridation, and, above all, an open and unprejudiced discussion of this important aspect of the matter.

The publication of Sutton's criticisms of the fluoridation trials [12] has, at last, resulted in some discussion of their shortcomings; but this makes it all the more disturbing that the various committees and professional bodies which have considered and published reports favourable to fluoridation have either failed to perceive, or else chosen to suppress any mention of, these quite obvious and elementary grounds for criticism. In the same way it has been left to me [11 13] to draw attention to the ludicrous inadequacy of the Bartlett-Cameron study [14] as a basis for assurances of "safety", and since my intervention a committee reporting to the American Medical Association [15] has shown that the mortality in the sample from Bartlett was, even after age-correction, significantly greater than that in the control sample, yet this study is still doggedly quoted to the public as evidence of "safety", and there has been no acknowledgment of the point, or defence offered, or intelligent discussion of the matter.

Under the circumstances it is not surprising that a great many people are convinced that they are being made the victims of mere prejudice arising from intensive propaganda and activity by the promotionists, and are likely to remain of that opinion until the more obvious and valid criticisms which can be brought against fluoridation are authoritatively presented and fully discussed, as has occurred in other countries such as Sweden and France, rather than being, as at present, left to the responsibility of random members of the public.

University College of North Wales, Bangor. C. G. DOBBS.

11. Dobbs, C. G. *Brit. dent. J.* 1957, **103**, 267.
12. Sutton, P. R. N. Fluoridation: Errors and Omissions in Experimental Trials. Melbourne and Cambridge, 1959.
13. Dobbs, C. G. *Brit. med. J.* 1955, i, 538.
14. Leone, N. C., Shimkin, M. B., Arnold, F. A., Stevenson, C. A., Zimmermann, E. R., Geiser, P. B., Lieberman, J. E. *in* Fluoridation as a Public Health Measure. Washington, 1954.
15. Joint Report of Councils on Drugs and on Food and Nutrition to the American Medical Association, 1957.

MATERNITY HOSPITAL REPORTS

SIR,—The long hours spent by junior medical staff in preparing these reports can only be justified if they are studied and discussed by all members of the obstetric staff of the unit concerned within a month or two of the end of the year to which they refer. This is a far more useful pastime than the widespread distribution of detailed reports several years out of date.

It may be true, as your annotation of March 19 says, that the considerable mortality and morbidity associated with childbirth is no longer a feature of the maternity report, but there are few obstetric units which can honestly contemplate with complete equanimity their last year's report. Careful study will almost invariably reveal that some aspect of the work of the unit needs improving. Herein lies the real value of the maternity report in providing not only a means of comparison of results with generally acceptable standards but also a way of gauging progress from year to year. Unfortunately, medical, administrative, and printing delays often combine to reduce the report to the status of a belated symbol of local prestige destined to adorn countless bookshelves up and down the country, unloved by those who have to finance their production and unread by those for whom the reading would be the most instructive.

London, S.E.3. J. M. BRUDENELL.

BRETYLIUM TOSYLATE IN THE TREATMENT OF HYPERTENSION

SIR,—Dr. Lowe and Professor Rosenheim (March 19) have drawn attention to an important side-effect of bretylium which, in our experience, is potentially dangerous. Syncope may occur suddenly and unpredictably on mild or brief exercise such as a short period of hurry, not necessarily running, for a bus. In two of our patients this has nearly increased the toll of deaths on the road and in others of accidents in the home.

Syncope may also occur apart from exertion. One of our patients has twice fainted whilst sitting in a chair but curiously enough postural hypotension with resultant syncope seems to be less frequent than with ganglion-blocking drugs. In every case so far syncope has occurred in patients in whom the standing diastolic pressure, when last recorded in the clinic, was still high.

As regards dyspnœa it is difficult to see how a fall of blood-pressure could itself result in this symptom and there is good reason to believe that a hæmodynamic explanation will be forthcoming in the near future. Likewise there is likely to be a full explanation for syncope on exertion.

Dizziness, which in our experience is a common complaint, may occur whilst merely strolling in the ward or working in the home or even at rest—again in patients without demonstrable postural hypotension. Until we recognised its significance this symptom was in some patients attributed to neurosis. In fact, we were inclined in the early days to attribute a number of side-effects to neurosis until it was apparent that they fell into clearly defined patterns.

From the pharmacological point of view bretylium is a fascinating drug and its many bizarre effects are providing a great stimulus to research.

Treatment, however, is beset with difficulties not only from tolerance, variable response, and side-effects but also because it seems likely that some patients with severe

hypertension have already lost their lives from persevering too long with bretylium when the pressure could probably have been better controlled with more conventional treatment. Meanwhile it is most important that all physicians and practitioners should be aware that bretylium, for all its advantages, is a difficult drug to manage and potentially the most dangerous preparation in current use for the treatment of hypertension so that it must be given only with great care and under close supervision. We ourselves look forward to its successor.

RICHARD TURNER
CLIFTON LOWTHER.

Edinburgh.

"LIES, DAMNED LIES, AND STATISTICS"

SIR,—Dr. Stoddart, in his letter of March 19, is, after all, saying only that figures lie when liars figure—a truth long recognised by professional statisticians who, more than any, deplore "woolly thinking on the question of statistics". But Dr. Stoddart is being too hard on his own profession. The standard of statistical analysis in the medical Press has improved enormously in the last decade or so, and it is still improving.

London, W.1. BERNARD BENJAMIN.

ROLE OF FUNDUS IN PREVENTION OF GASTRO-ŒSOPHAGEAL REGURGITATION

SIR,—Mr. Goldberg (March 19) states that the sphincteric function of the lower œsophagus fails when the cardia is situated above the diaphragm and that this failure cannot be explained.

The presence in the lowermost œsophagus of a zone that acts as a physiological sphincter is well established. It is based on the manometric studies of Fyke et al., and of others who found a band of elevated resting pressure which extends from 1–2 cm. below the diaphragm to 1–2 cm. above the diaphragmatic hiatus. The pressure in this zone is such that in both phases of respiration a barrier of high pressure exists between the stomach and the œsophagus. At the end of expiration the band of high pressure lies mainly above the diaphragmatic hiatus, whereas at the end of inspiration it is wholly below the diaphragm. At the end of inspiration only the infradiaphragmatic part of the gastro-œsophageal sphincter constitutes a barrier against gastro-œsophageal reflux. It should be emphasised that it is not an anatomical segment of the œsophagus that moves downwards with inspiration and upwards with expiration; it is only a shift in maximal pressure from the superior to the inferior part of the sphincteric zone and vice versa. This shift of maximal pressure, which is so important for the normal function of the closing mechanism of the cardia, is made possible by the fact that part of the sphincteric zone is situated in the abdominal cavity. Indeed, the intraluminal pressure in the sphincteric segment is the result of two forces—namely, the muscular tone of this segment and the influence of extra-œsophageal respiratory pressure variations in the thorax and the abdomen. With inspiration the intrathoracic pressure decreases and the intra-abdominal pressure increases, thus resulting in a decrease of the intraluminal pressure in the supradiaphragmatic segment of the physiological sphincter and an increase of pressure in the infradiaphragmatic part of the sphincteric segment. For this reason the band of high pressure, and consequently the barrier against gastro-œsophageal reflux, is wholly below the diaphragm at the end of inspiration.

In the presence of a sliding hiatus hernia the entire sphincteric segment is situated in the thoracic cavity. Inspiration decreases the pressure of the entire zone. When, in these circumstances, the tone of the sphincteric segment is not strong enough, inspiration results in an abolishment of the barrier against reflux. This is one of the reasons why the sphincteric mechanism may fail when the cardia is situated above the diaphragm.

We should like to ask Mr. Goldberg whether suturing the fundus of the stomach to the lower end of the œsophagus in cases of hiatus hernia, "restoring as perfectly as possible the normal anatomical appearances of the cardiac and fundal region", did not result in the downward displacement and the re-creation of an intra-abdominal part of the physiologic sphincter.

Department of Internal Medicine,
University Hospital St. Raphael,
University of Louvain Medical School,
Louvain, Belgium. GASTON VANTRAPPEN.

PEPTIC ULCER IN TOWN AND COUNTRY

SIR,—In your leading article of Feb. 27 you draw attention to the careful survey carried out by Pulvertaft of the incidence of *proven* new cases of duodenal and gastric ulcer in York and its environs. You justifiably emphasise the importance of the stringent criteria of diagnosis adopted by Pulvertaft to ensure the comparability of his cases.

We wish to draw your readers' attention to a possible disadvantage of data based on such stringent criteria. There is the danger that in interpreting regional and other variations in these confirmed cases of peptic ulcer it may be implicitly, and possibly falsely, assumed that the number of persons with a newly proven ulcer (involving hospital diagnosis) will be directly related to the number of persons at the pre-ulcer stage of the disease.

Patients whose clinical condition satisfies the strict standards adopted by Pulvertaft will have already reached the established ulcer stage of a disease which, as we have shown,[1] may have a milder pre-ulcerous stage. That such a pre-ulcerous stage exists is implicitly acknowledged by Pulvertaft and other workers, in their assessment of the age at onset when the first symptoms appear. In the paper referred to above, we reported that of the 25 patients with "? peptic ulcer" non-ulcer dyspepsia, 6 had passed into the proven ulcer category (on Pulvertaft's criteria) during a period of approximately eighteen months.

In this connection it is of interest to note that the shape of Pulvertaft's graph showing the incidence of new peptic-ulcer cases according to age at onset among males is similar to that of our graph of the prevalence of non-ulcer dyspepsia for old and new cases. Both graphs show a tendency to two peaks, one between the ages of 25 and 35 years, the other at 65 years, although the double peak is not so marked in Pulvertaft's graph. A similarity can also be found between our graph of peptic-ulcer prevalence by age in males and that of Pulvertaft for peptic-ulcer incidence according to age at diagnosis in males. Both these graphs show a maximum frequency in the 50–60 age-group.

In our series, by a thorough screening of the practice, we were able to find among our male patients a greater prevalence of peptic ulcer than of non-ulcer dyspepsia—a ratio of 2·8 : 1. This was an unusual finding, and in our view indicates the extent to which the prevalence (and incidence) of proven peptic ulcer depends on the efficiency of the screening method adopted. This, in turn, will depend on the extent to which patients consult their doctor for dyspeptic symptoms. This, we know, varies widely according to sex, age, occupation, and social class, and the location of the practice.

There is still a need, therefore, as we urged in our paper, for studies of non-ulcer dyspepsia and peptic ulcer in general practice.

S. LIPETZ
S. A. SKLAROFF
L. STEIN.

Edinburgh.

SIR,—In your leading article of Feb. 27 you say that "the frequency of acute perforation in duodenal ulcer in men in York appeared appreciably higher than in Glasgow and Aberdeen but no similar trend was noted in women".

1. *Brit. med. J.* 1955, ii, 172.

This is not quite accurate and is, therefore, possibly misleading.

The sentence should probably read " appreciably *lower* than in Glasgow and Aberdeen ". In connection with the absence of a similar trend in women, it does not appear that this is actually implied by Pulvertaft.[1] He shows, in fact, that so far as total perforations are concerned, this condition is more common in women living in the Glasgow area than in the city of York. The corresponding figure for the city of Aberdeen for the same years is 7·0 per 100,000 of the female population. This is more than twice the Glasgow annual rate and although based on small numbers, since perforation is relatively uncommon amongst women, seems to suggest that there may be a similar trend in women, both for the total perforation-rate and the duodenal perforation-rate.

Department of Public Health and Social Medicine, University of Aberdeen. R. DEANS WEIR.

POSTCOITAL EXAMINATION OF SEMEN

SIR,—I am giving you some earlier references [2–5] dealing with the successful treatment of subfertile men, as requested by Mr. Dunn (March 12). Dr. Farris' book, which he quotes to restate his case, was published in 1950, ten years ago; a good deal of work has been done since then.

London, W.1. H. A. DAVIDSON.

ANTI-SMOKING CAMPAIGN

SIR,—Mr. Rowntree (March 19) attributes the failure of the Edinburgh campaign to its use of " impersonal and didactic " methods. Although we would not dissent from the view that such methods are not in general the best suited to produce changes in attitudes and behaviour, we doubt whether the use of alternative media would have ensured the success of the campaign. It seems to us that Mr. Rowntree, like many other health educators in this country, attaches so much importance to techniques of presentation that he tends to ignore the psychological implications of the message he seeks to convey and of the behaviour he hopes to change. We are convinced that to change smoking habits on any substantial scale does not depend simply upon making the correct choice between alternative media of communication, but rather upon our first acquiring a much deeper understanding than we possess at present of such questions as why people start to smoke; what factors confirm them in their smoking habits; why some smoke a little and others a lot; what part considerations of " risk " and " probability " play in the thinking of people of different levels of education; what emotional reactions are aroused by threats of cancer; and many others, which could be specified.

Finally, may we make it clear that we played no part at all in the planning and execution of the campaign? We were concerned only with assessing the success or failure of the campaign, and our roles were analogous to those of auditors. We believe, incidentally, that to have sought independent and objective evaluation in this way reflects considerable credit on the Edinburgh Public Health Department.

Department of Public Health and Social Medicine, University of Edinburgh. ANN CARTWRIGHT F. M. MARTIN.

1. Pulvertaft, C. N. *Brit. J. prev. soc. Med.*, 1959, **13**, 131.
2. Davidson, H. A. *Practitioner*, 1954, **173**, 703.
3. Hanley, H. G. *Ann. R. Coll. Surg. Engl.* 1955, **17**, 159.
4. Hanley, H. G. Proceedings of the 2nd World Congress on Fertility and Sterility, 1956.
5. Tulloch, W. S. *Brit. med. J.* 1955 ii, 356.

CEREBRAL ANGIOGRAPHY IN THE DIAGNOSIS OF THE ACUTE STROKE

SIR,—Since its inception in 1927, cerebral angiography has expanded enormously, thus marking for Egas Moniz an outstanding and lasting place in the history of medicine. If Dandy baked the bread, Moniz buttered it so thickly that the neuroradiologist was evolved, à vous bonne chance. With the advance of knowledge and the development of more and more complicated techniques in neurosurgery, chest surgery, and many other branches of medicine, the " one-man-band " was replaced by a team. Such a team, a radiologist and two physicians, produced the paper in your issue of March 12. Of their 80 patients submitted to angiography, Dr. Bull and his colleagues demonstrated a specific lesion in 33, but more significantly the lesion was not diagnosable clinically in 17, despite the excellence of the physicians. This work is of unquestionable value.

It is on the " hazards of angiography " that I should like to make a few comments. In 1955, in a paper entitled Towards Safer Angiography,[1] I analysed eight published series of angiograms from the point of view of technique, selection, and, more especially, safety. I found that in 3128 angiograms, there were 22 deaths and 81 complications; of the complications, 23 were permanent and 58 transient. My own series [1] and that of Ver Brugghen [2] were free from mortality or serious complication. A year later, Segelov,[3] in his paper, Safe Angiography, recorded a series of 660 angiograms of his own, again without complication, and he reproduced my table.

Mainly out of interest, partly from necessity, I took charge of angiography in the Regional Neurosurgical Centre, Liverpool, from 1954. I taught and supervised my trainees, I was free to reject a request for angiography from other clinicians, and I had some excellent anæsthetists. Reviewing the work of the past six years, the growth of this investigation is reflected in the following numbers:

	Angiograms	*Patients*
1954	273	169
1955	436	290
1956	459	284
1957	528	403
1958	757	543
1959	730	554
Total ..	3183	2243

There was 1 death (pulmonary embolism); 1 permanent partial hemiparesis (angiography and ventriculography were performed under the same anæsthetic); and 5 other transient complications. Each patient was examined at least once during the twenty-four hours following angiography. Certainly the stringent method of Bull et al. of assessing morbidity and apportioning it to angiography was not applied in this series. In a case of vascular glioma, the angiography was followed by an immediate biopsy and if this induced bleeding into the tumour; the paralysis that followed was ascribed to the hæmorrhage, not to the angiography. It may be that the incidence of morbidity in our material was in fact greater than indicated, yet in none of the 57 cases of internal carotid or middle cerebral thrombosis was there any increase in the clinical deficit, even when angiography was performed bilaterally.

The safety of cerebral angiography depends upon several factors: the contrast medium; the personal skill and experience of the angiographer; and my firm personal belief is that a general anæsthetic is another important aid to safety. The anæsthetist as a member of the team must understand the problems involved as thoroughly as the clinician and the radiologist. There is no room for amateurism and all the trainees must be supervised. The clinician who insists on angiography regardless of individual circumstances, the radiologist who for long periods spears every structure in the neck, the anæsthetist ignorant or mindless of a dangerous drop in blood-pressure are all responsible for mortality.

1. Sedzimir, C. B. *J. Neurosurg.* 1955, **12**, 460.
2. Ver Brugghen, A. *Arch. Neurol. Psychiat.* 1954, **71**, 518.
3. Segelow, J. N. *J. Neurosurg.* 1956, **13**, 567.

Dr. Bull and his colleagues investigated patients theoretically representing the greatest potential risks. The fact that they had no mortality and reported only 9 transient complications, despite their strict assessment, gives weight to their conclusion that only " centres with facilities should continue their endeavours to assess the place of angiography in the management of acute strokes in relation to the methods of treatment available ", to which I should like to add " and only such centres should use angiography in the management of any condition necessitating this investigation ".

Walton Hospital, Liverpool. C. B. SEDZIMIR.

STAPHYLOCOCCAL INFECTION IN NURSES

SIR,—The article by Dr. Davies (March 19) will stimulate the search for ways of decreasing the time that nursing and ancillary staffs spend off duty on account of minor staphylococcal infections.

A possible method which seems to have received less attention than it deserves is the use of a plastic " skin " to be sprayed or painted on to form a protective covering over surface lesions. This would serve the double purpose of protecting the lesions from further infection or injury and acting as a bacterial barrier to the dissemination of organisms from them. Furthermore, it would be technically very simple to incorporate some suitable bactericidal substance in the " skin ".

Some investigation has already been done on these lines, notably by Wright,[1] Leader,[2] and Ritelli,[3] but it appears that further research into the use of such methods would be of value.

D. E. STEELE
Hythe, Kent. Medical Adviser, Portland Plastics Ltd.

ENVIRONMENTAL STAPHYLOCOCCAL CONTAMINATION

SIR,—I was very interested in the article on staphylococcal contamination by Dr. Foster (March 26). What particularly struck me was the " fallout " of contamination shown in fig. 3. It is very noticeable that one side of the ward is much more heavily contaminated than the other, and I am moved to wonder why: is the ward cleaned by two people, one of whom does floors more efficiently than the other? Are dressings done by two dressing teams, one more conscientious than the other? Are the curtains or screens on each side of the ward made of similar material, and how efficient is curtain cleansing?

I have always thought that a vacuum duster would be a much more useful tool than a floor-washing machine in any hospital; it is deplorable that staff should still be flapping about with dirty fluffy rags, wet or dry, in any surgical ward. Bacteria on the floor must have come from beds or dressings and therefore had to be airborne at some time: the removal of dust by a vacuum cleaner is better than waiting for it to settle on a washable surface, especially as large quantities of it settle anyway on surfaces unlikely to be washed, such as curtains.

As a small comment on ward administration, would it not be safer to put all " dirty " beds together and so concentrate bacteria in one corner of the ward? We always did this twenty years ago in my training school—not that we ever expected to have eight " dirty " cases out of thirty in those days, but if we had they would not have been allowed to spread themselves all over the ward as seems to be the case here.

One other point—why no bacterial fallout from one of the beds at all? Had this unfortunate an infection other than *Staph. aureus*, and if not, what is the answer?

Tooting Bec Hospital, London, S.W.17. UNA V. BUDGE
Principal Tutor.

1. Wright, H. W. S. *Lancet*, 1944, i, 664.
2. Leader, S. A. *Lister J.* 1945, **8**, 1.
3. Ritelli, D. *Gazz. Med. Ital.* 1955, **114**, 12.

PERTHES' DISEASE

SIR,—In your issue of March 19 Dr. Cockshott and Dr. Palmer, writing from Nigeria and Rhodesia, disapprove of my statement that " the Negro child appears to be immune to Perthes', or at least seems to be only exceptionally affected by it ", which I included in my letter of Feb. 13.

The only written reference to the frequency of Perthes' among Negro children which I know is given in C. W. Goff's book.[1] He states that among 110,555 coloured children admitted to the Charity Hospital, Louisiana, New Orleans, from 1941 to 1951, not 1 case of Perthes' was recorded, and that in the Hospital for Joint Diseases, New York, with an admission-rate of 20% coloured, not a single Perthes' was ever seen. Only the Tennessee Crippled Children's Register reported that they had treated 68 white and 6 Negro children affected by this condition. Davies (quoted by Goff), writing from Makerere College Medical School, Kampala, Uganda, reports practically no evidence of Perthes' among the Negro population.

All this information was further supported in the discussion at the Latin-American Congress of 1956 in Mexico City of my paper on the blood-supply of the femoral head during growth. Dr. Oswaldo Campos, in charge of a large children's hospital in Rio de Janeiro, with a large Negro rate of admission, reported that he had hardly ever seen Negro children with Perthes'; and Dr. Harold Boyd from Memphis corroborated these views.

I am sure many will welcome my letter if it may have served to stimulate Dr. Cockshott and Dr. Palmer to make a survey of real or true Perthes' among Negro children in Ibadan, of course excluding not only sickle-cell anæmia but also subluxation, infective coxitis, and enchondral chondrodystrophy.

Nuffield Orthopædic Centre, Oxford. J. TRUETA.

CORPORAL PUNISHMENT

SIR,—We are accustomed to logical fallacies, and sentimentality, in discussions on this subject; but may I suggest that Dr. Waycott's article (March 26) reaches an exceptional standard in both respects. To quote only two examples of petitio principii, he speaks of " the present agitation for the restoration of corporal punishment . . . based, as it is, on fear and ignorance ", and " as our ideas of criminal responsibility alter ". Both statements may be true, but he gives no evidence to support these assertions.

He says there is no proof of the deterrent effect of corporal punishment, and indeed that no proof can be given statistically. May I suggest that an answer is to be found in Pavlov's work on conditioned reflexes. In quite lowly forms of animal life conditioned inhibition of even powerfully attractive stimuli can be readily established by associating them with pain. One might reasonably expect in man to inhibit anti-social activities by associating them with pain and other unpleasant experiences. Folk wisdom has long since enshrined this in the proverb " A burnt child dreads the fire ".

Dr. Waycott asserts that the decline in the number of birchings was explicable only because the courts had found the birch useless as a deterrent; alternative explanations are at least tenable. It may be that this decline was due to growth of sentimentality in magistrates, and to a possibly unwarranted belief in the value of psychological methods of tackling the offender. His description of the technique of corporal punishment, quoted from the Cadogan report, is unpleasant, but this is irrelevant to the merits of the punishment. As a young practitioner I found it unpleasant to give anæsthetics for dental extractions, or for avulsion of a toenail, but as a rational being I recognised the necessity of such procedures.

Lastly, some of us reactionaries are not very much interested in his point as to the value or otherwise of corporal punishment in constructive treatment of offenders: we are more selfishly

1. Legg-Calvé-Perthes Syndrome and Related Osteochondroses of Youth. Springfield, Ill., 1954.

concerned with whether it tends to make life more secure for us and our families; and we are even sceptical as to the value of more refined methods in remodelling the offender's mind. Physiology does show the obvious—that one entry to the consciousness of man is via the sensory nervous system!

Todmorden, Lancs. R. C. WEBSTER.

CRYPTOGENIC LIVER ABSCESS

SIR,—The interesting and instructive article by Dr. Stokes (Feb. 13) establishes the remarkable rarity of this condition. We wish to mention, therefore, a recent case involving left, rather than right, hepatic lobe, investigated and treated in a small suburban hospital of 130 beds.

A formerly healthy 30-year-old man was admitted on Nov. 16, 1959, suffering a diurnal febrile illness dating from Oct. 28. Symptoms consisted of daily fever to 104°F, generalised headache, malaise, nausea with occasional vomiting, and finally aching lower sternal and left subcostal pain. Guarding of the abdomen was marked, but an area of resistance seemed apparent under the left costal margin, although neither liver nor spleen could be certainly felt. In a battery of laboratory investigations only a white-cell count of 16,000 per c.mm., later rising to 33,000 (predominantly granulocytic), and two positive blood-cultures showing a heavy pure growth of microaerophilic streptococci were revealing. Response to large daily doses of penicillin was satisfactory.

Recovery appeared complete, and the patient was discharged home on Dec. 5. Readmission, however, became urgently necessary on Dec. 17, because of weight-loss, recurrent fever, and increasing upper abdominal pain. Hæmoglobin had dropped from 89% to 78% and the white count had again risen to 13,500. Further blood-cultures were sterile. The liver was, on this occasion, palpable and acutely tender, particularly over left lobe. Under cover of penicillin, surgical drainage of an orange-sized left hepatic abscess was performed Jan. 9. An attempt to open the mass extraperitoneally was not possible. Culture of thick yellowish-green purulent material from the abscess revealed the organism obtained on two former blood-cultures. Subsequent recovery has been satisfactory and gratifying.

Toronto. JOHN PETERSON
WILLIAM B. PHAIR.

PLACENTA PRÆVIA

SIR,—In reply to Dr. Blair Hartley (March 19), I would say that I do not need to go to Manchester because I have already been, have seen the beautiful X-rays produced in his department, and realise how valuable his assistance can be. How many obstetrical units, even in the United Kingdom, and still less in the underdeveloped parts of the world, have the skilled advice that is available in Saint Mary's Hospital, Manchester? Therefore, until such highly specialised radiology is widely available I think it wiser to teach our students, and still more so our future consultants, to depend on careful clinical observation rather than inadequate radiology.

Dr. Blair Hartley criticises me for quoting him out of context. I could also complain. Had he continued reading my article he would have found that I stated: "If I am right, the differentiation between non-toxic accidental hæmorrhage and hæmorrhage from placenta prævia is of little practical value at this period of gestation, since the patient should in any case be retained in hospital for investigation and observation."

I may not have made my point clear, but I was trying to show where Mr. Percival and I differed. If Mr. Percival can demonstrate the placenta by radiological methods in the upper uterine segment he allows a certain number of cases of antepartum hæmorrhage to return home so as to utilise available antenatal beds.

As we do not know the extent of the risk to which we submit the unborn child when we expose it to X-rays (and some authorities state that it is considerable), it is doubtful if exposure for four films is justified when the same information can be obtained in a large proportion of cases by careful clinical examination.

The use of placentography in the occasional case not elucidated by clinical examination to differentiate between placenta prævia and accidental hæmorrhage is still hardly justifiable when, as I believe, both types of case should be retained under observation in hospital.

An X-ray is advisable if there is any question of fœtal abnormality, because the presence of an abnormal fœtus will alter the future treatment.

Department of Midwifery and Gynæcology,
Institute of Clinical Science,
Queen's University of Belfast. C. H. G. MACAFEE.

HEPATITIS AFTER INOCULATION

SIR,—A patient who submits to an inoculation has a right to expect that all reasonable safety measures have been taken. It is now 10 years since Evans and Spooner showed that aspiration of tissue fluid into the barrel of a syringe occurs when the needle is removed after an injection, and, as you stress in your leader of March 5, the only method of eliminating the risk of post-inoculation hepatitis is to use a separate sterile syringe and needle for each person inoculated. You state, however, that this is admittedly an inconvenient procedure.

At the inoculation clinic at this hospital we have been using a separate syringe and needle for each patient inoculated since 1953. Approximately 30,000 people are inoculated annually, and as means of sterilisation was already available in the hospital, all that was needed to start the scheme was the purchase of about 300 syringes. These are packed in the ordinary blood-transfusion boxes between layers of lint and sterilised in the autoclave: the needles are sterilised separately in the hot-air oven.

Before the clinic begins the sister-in-charge loads each syringe with the material required, fits a needle which is covered with a sterile tube, and the patients are called in in small groups. We find this much more convenient than the old method, and for a relatively small cost syringe-transmitted hepatitis has been completely eliminated.

Hospital for Tropical Diseases,
London, N.W.1. L. ROODYN.

SIR,—Your leading article stated: "inoculation clinics must be better organised, with enough helpers to sterilise and load syringes". Subsequently, you said that boiling will be found less practicable than dry-heat sterilisation.

I had understood that, in fact, the main disadvantage of boiling was not its impracticability but the fact that it did not sterilise the syringe, and so did not provide a guarantee against the risk of transmission of hepatitis by this means. If this is correct, the implications of your article would seem to be misleading.

Perhaps some clear guidance on this point will be given in the new M.R.C. memorandum.

Health Department,
Oxford. M. J. PLEYDELL
County Medical Officer of Health.

SIR,—As you say, the information contained in your valuable leading article has been well known to the medical profession for several years.[1] Undoubtedly the principle of one patient, one sterile needle, and one sterile syringe is an attainable ideal in the prevention of post-injection hepatitis.

May I suggest that it is necessary to tackle the entire subject—namely, the prevention of hepatitis the ætiological agent of

1. Mackay-Dick, J. *J. R. Army med. Cps*, 1947, **89**, 290.

which is transmitted to patients by means directed primarily to the saving of life, the maintenance of health, the comfort of the patient, and the prevention of disease? This type of jaundice may well result from, for example, a saline and/or glucose intravenous drip using equipment imperfectly cleaned and sterilised after a blood-transfusion, or the administration of plasma, to another patient. Because of this it may be suggested that as far as possible all such apparatus should be discarded after each blood-transfusion. Tattooing is another long-recognised manner of acquiring this type of hepatitis, several examples of which I have seen in recent years overseas.

Bordon, Hants. JOHN MACKAY-DICK.

PRIVATE PATIENTS IN THE NATIONAL SCHEME

SIR,—If there are indeed, as "Former Locum" implies in his letter of March 26, doctors who accept fees from their own N.H.S. patients, they must be incredibly foolhardy. By so doing not only do they commit a gross breach of their terms of service: they also lay themselves wide open to blackmail.

Crediton, Devon. L. N. JACKSON.

DIURETIC EFFECT OF SPIROLACTONE SC-9420

SIR,—In *The Lancet* of March 12, Dr. Clowdus and his colleagues discussed the treatment of refractory ascites with SC-9420. Here are further data.

We have treated with SC-9420 11 patients with cirrhotic ascites refractory to corticoids and thiazide diuretics. In 9, a dramatic improvement was obtained; natriuresis increased from below 10 mEq. to a maximum of 240 mEq. per twenty-four hours, with SC-9420 alone, making unnecessary the use of other diuretics; in 1, a moderate improvement only was achieved; and 1 case was a failure. However, because of the impossibility of obtaining, in most cases, a return to normal of aldosterone secretion, sodium retention and œdema reappeared several days after stopping SC-9420. Therefore, SC-9420 courses were repeated at intervals. Satisfactory control of œdema can be achieved for a long time, without maintaining strict low-sodium diet; the tolerance of SC-9420 is excellent and its activity remains unabated. In our experience, the use of cortisone-like steroids [1] first, then (in case of failure) spirolactone, has entirely modified the course of cirrhotic œdemas, if not of liver cirrhosis.

Our first results were published [2] in October, 1959.

Department of Internal Medicine, Hôpital Saint Antoine, Paris, XII. P. VESIN.

OLD ST. THOMAS'S HOSPITAL OPERATING-THEATRE

SIR,—Some 3 years ago the female operating-theatre of old St. Thomas's Hospital was discovered by Mr. Raymond Russell in the roof space of the Chapter House in St. Thomas's Street. Many of your readers may not know that St. Thomas's Hospital used to be on the opposite side of the street to Guy's Hospital until it was forced to move by the coming of the railways in 1860. In the *Guy's Hospital Reports* (1957, **106**, 133) Mr. Raymond Russell has written a full account of this early 19th-century operating-theatre.

As the theatre is of considerable historical interest and importance a committee has been formed to restore it to its former state. Much research is necessary and we feel that some of your readers may be able to help us in two ways.

(1) If they know of any drawings, paintings, photographs, &c., of the old St. Thomas's female operating-theatre or of any other information about it.

(2) If they know of any early 19th-century theatre equipment or furniture such as side-tables, wash-bowls, hanging lamps, chairs or seats, &c., &c.

It is probable that there is much material of this sort tucked away in hospitals around the country and they could prove invaluable in the restoration.

St. Thomas's Hospital, London, S.E.1. NORMAN BARRETT.
Guy's Hospital, London S.E.1. RUSSELL BROCK.

INTRAVASCULAR CLOTTING

SIR,—It is gratifying that my letters of Jan. 16 and 30 have prompted replies, because only by an exchange of views can a better mutual understanding of such a complicated problem as intravascular clotting be attained.

I fully agree with Dr. Sevitt (Feb. 13) that venous stasis plays a major ætiological role in deep venous thrombosis, and I feel that maintenance of good venous circulation may be far more important than anticoagulants for preventing thrombosis in certain instances. Stasis, however, cannot initiate a clot when the endothelium is normal. Blood remains completely fluid for a surprisingly long period in a silicone-coated container, and certainly this crude surface is not comparable in efficiency to the healthy endothelial lining of the vascular system. Probably the only known agent in the blood that can per se initiate the clotting reaction is erythrocytin,[1] but it is questionable whether enough can escape from intact erythrocytes to be of any consequence. The ubiquitous distribution of preformed thromboplastin in body tissues including the walls of the blood-vessels offers a clue. The release of thromboplastin from the vessel wall does not require a gross injury—very likely, prolonged anoxia may suffice—to induce enough temporary alteration in the endothelium for this to happen. Stasis alone does not explain the initiation of the thrombus, its attachment to the vessel wall, its structure and growth in the bloodstream, though it often plays an exceedingly important ætiological role. Intravascular clotting can and does occur, however, in the absence of demonstrable stasis as illustrated by thrombophlebitis migrans.

In regard to the letter of Dr. Walker and Dr. Matthews (Feb. 13), I am certain that they "meant in no way to detract from the basic physiological and practical diagnostic merits of the one-stage prothrombin-time technique", for if they had, they would have condemned the thrombotest and all the multifarious modifications of the original method. The crucial question is whether my method carried out according to my specific directions has the shortcomings that necessitate its replacement for controlling anticoagulant therapy.

According to Professor Owren (Nov. 7) my method "is not ideal" because "it requires experience and skill" and "the quality of the thromboplastin is of decisive importance". When I developed the test, I took these factors into careful consideration. After years of study, I succeeded in working out a simple method for obtaining a thromboplastin reagent which gives a prothrombin-time of 11·5–12 seconds consistently. The directions for the preparation have been explicitly described, and no laboratory, therefore, need be dependent on any particular commercial preparation.

The basic disagreement, however, is brought out by Dr. Walker and Dr. Matthews' statement: "Surely he would not deny that unduly severe depression of true prothrombin and of factor IX can exist unrevealed by the one-stage test . . ." I emphatically deny the correctness of this statement. Some time ago the erroneous claim was made that the one-stage method was insensitive to prothrombin, and this has been repeated often enough to have acquired some of the prerogative of a fact. I have repeatedly studied two brothers with congenital hypoprothrombinæmia. The diagnosis has been established both by my modified prothrombin-time tests and by the Iowa two-stage method. The prothrombin-time of these boys is usually 20–24 seconds, and has never been shorter than 19 seconds; both

1. Vesin, P. *Arch. Mal. App. Dig.* 1959, **12**, 1497.
2. Vesin, P., et al. *Bull. Soc. méd. Hôp. Paris*, 1959, **24–25**, 826.

1. Quick, A. J. *Amer. J. med. Sci.* 1960, **239**, 51.

boys are mild bleeders. The third patient with congenital hypoprothrombinæmia vera is a girl, age 10, whose prothrombin-time averages 60 seconds. She has required a plasma transfusion every five weeks since birth. Thus, the test serves as a delicate and quantitative indicator of the bleeding state in pure prothrombin deficiency.

When the prothrombin-time is longer than 30 seconds, a bleeding tendency occurs whether the defect is lack of prothrombin, factors V or VII, or Stuart-Prower factor. Factor IX does not affect the test, since the prothrombin-time is normal even in severe hæmophilia B (Christmas disease). It has been the observation of Dr. David LaFond, who has been working in my laboratory, that only in long-term anticoagulant therapy is factor IX occasionally decreased significantly. Under these conditions, however, the decrease of prothrombin and factor VII so overshadows the former that the prothrombin-time remains a reliable guide.

I do not doubt that bleeding occurs at times when the prothrombin-time appears to be in the therapeutic range. What is puzzling to me is why it does not occur more frequently when the test is performed in such a manner that a normal range of 11–20 seconds is permitted.

The one-stage test was developed for diagnostic purposes; later, it proved to be an important tool of research. I was not consulted when it was introduced to control anticoagulant therapy. The evaluation of the test for this purpose belongs primarily to those who employ it. If it is the consensus of those who carry out the procedure carefully with a properly prepared thromboplastin reagent that the Quick test is unreliable, I shall be among the first to recommend its withdrawal from the clinical laboratory.

Department of Biochemistry,
Marquette University
School of Medicine,
Milwaukee, Wisconsin.

ARMAND J. QUICK.

ABSENT CIRCULATORY REFLEXES IN DIABETIC NEURITIS

SIR,—I wonder if Professor Sharpey-Schafer and Dr. Taylor (March 12) are justified in concluding that "severity and duration of the diabetic state were not factors" in the loss of circulatory reflexes in diabetic neuritis. What they have shown is that some patients developed the neuritis within a year of diabetes being diagnosed—i.e., that the condition can appear early in the (recognised) course of diabetes. But in order to conclude that duration is not a factor in the ætiology of the neuritis they would have to show that their patients with neuritis have not had diabetes for longer, on average, than those without. There is admittedly some support for their conclusion from the fact that the seventeen patients with complete loss of circulatory reflexes had had diabetes for no longer than the fourteen with only partial loss (an average of 9 and 12½ years respectively).

Professor Sharpey-Schafer and Dr. Taylor present no data for the "severity" of diabetes among their patients without neuritis; so it is impossible to say that it is not a factor. There are varying definitions of "severity" in diabetes; the most helpful is dependance upon treatment. A patient on a small dose of insulin may be more "severe" than one on a large dose. Thus their category "controlled on moderate doses of insulin" does not necessarily represent a group of equal severity. What they are presumably trying to measure is control of the disease, which is even more difficult.

The authors do not comment on the predominance of men among their cases (twenty-five to six) which, if they were selected from a representative group of diabetics, would correspond to a sex-ratio of about 6 : 1. (All the patients, except one, with complete loss of circulatory reflexes were men.) Nor do they remark upon the ages of their patients. Only three of thirty-one patients were under forty-five years old. Without knowing the age-distribution of the patients from whom these thirty-one were selected one cannot say whether age is an ætiological factor, but in most diabetic clinics more than 10% of the patients are under forty-five, especially among the men.

King's College Hospital,
London, S.E.5.

D. A. PYKE.

TOXIC MARROW FAILURE TREATED BY A HOMOGRAFT OF FŒTAL HÆMOPOIETIC TISSUE

SIR,—We were interested to read of the use of fœtal liver transfusion in combating marrow depression due to thiotepa.[1] Three of our patients with advanced carcinoma of the breast who were given thiotepa in doses similar to that used by Dr. Bridges and his colleagues developed severe marrow depression which appeared to respond to prednisone alone.

In one patient the total white-cell count fell to 700 per c.mm. and the platelet-count to 40,000 per c.mm. She was well six months later, having discharged herself from a terminal home. Another patient's total white-cell count fell to 750 per c.mm. and the platelets to 22,000 per c.mm. She was well seven months later. In the third case the total white-cell count fell to 600 per c.mm. and the platelet-count to 15,000 per c.mm. She had a hæmatological remission but died five weeks later.

In our patients the blood-count improvement coincided with the oral administration of prednisone 30 mg. daily. In the case quoted by Bridges et al. methylprednisolone was started the day before the fœtal liver transfusion. We wonder how much the latter contributed to the hæmatological recovery.

Middlesex Hospital,
London, W.1.

A. M. JELLIFFE.

Hammersmith Hospital,
London, W.12.

M. SUTTON.

SNAKEBITE

SIR,—The word "envenomation", which occurs on p. 690 of your issue of March 26, is not to be found in Chambers or in The Shorter Oxford English Dictionary, nor likely to be found in any other (though there is a verb to envenom, nearly always used metaphorically). Has it any advantage over "poisoning"?

London, S.W.20.

JOHN PENMAN.

RENAL TUBULAR FUNCTION IN HYPERPARATHYROIDISM

SIR,—Dr. Fourman and his colleagues (March 19) raise the interesting possibility that defects of renal tubular function may be of value in separating patients with hyperparathyroidism from other patients with renal calculi. Since hearing them speak on this subject, I have had the opportunity to study two patients with hyperparathyroidism, and a third patient who almost certainly has hyperparathyroidism.

The test differed slightly from theirs in that the patients were deprived of water for 14–16 hours before the mannitol infusion, and 2 hours before the infusion they were given a single dose of vasopressin. No water was given during the mannitol infusion. Under these conditions my hyperparathyroid patients (see table) behaved in response to mannitol infusion

Patients	Urine (mOsm. per l.)		T^cH_2O	Urine pH after NH_4Cl
	Max.	Min.		
1	690	455	+4·3	5·7*
2	640	565	+4·0	5·0
3	658	425	+5·07	4·9
4†	280	254	−0·23	6·4

* In response to 0·05 g. NH_4Cl per kg. body-weight.
† Renal tubular acidosis. Patients 1, 2, and 3 have hyperparathyroidism.

1. Bridges, J. B., Bridges, J. M., Edelstyn, G. J. A., Lyons, A. R., Nelson, M. G. *Lancet*, March 19, 1960, p. 629.

like their patients without hyperparathyroidism. Their renal function was in other respects unimpaired. A young patient with renal stones but without hyperparathyroidism was also studied, and she performed very poorly in response to mannitol infusion. However, it was later decided that her calculi were due to renal tubular acidosis.

The response to ammonium-chloride loading was also tested, and the results are included in the table. Two of the hyperparathyroid subjects behaved normally in this respect also; the third one was given a lower dose of ammonium chloride than is suggested by Fourman et al.

My results suggest that not all hyperparathyroid subjects behave abnormally during osmotic diuresis induced by mannitol infusion, and following ammonium-chloride loading. However, it should be remembered that the conditions under which I infused mannitol differed slightly from those used by Fourman et al.

Department of Medicine,
Institute of Clinical Science,
Queen's University of Belfast. MARY G. MCGEOWN.

ASCARIS LUMBRICOIDES WANTED

Dr. L. F. Taffs, M.R.C.V.S., of the Department of Animal Pathology, School of Veterinary Medicine, Madingley Road, Cambridge, writes:

"I am having difficulty in obtaining, for research purposes, specimens of the human intestinal roundworm *Ascaris lumbricoides*. I should be most grateful if any of your readers could supply me with any adult female worms, which they may find either in stools or at necropsy."

Obituary

DOUGLAS JAMES ACWORTH KERR
M.D. Edin., F.R.C.P.E., D.P.H., F.R.S.E.

Dr. Douglas Kerr, regius professor of forensic medicine in the University of Edinburgh since 1953, died on March 23 at the age of 65.

He was born at Bradford and was educated at St. Paul's School, London, and the University of Edinburgh. He was wounded in 1914 while serving with the Royal Artillery, and transferred to an anti-aircraft unit of the Royal Flying Corps. In 1918 he returned to Edinburgh to complete his studies, graduating M.B. in 1920. After qualifying he held resident posts at Edinburgh Royal Infirmary and in 1922 took the D.P.H. In 1927 he took the M.D. with commendation and was elected F.R.C.P.E. Two years later he was appointed police surgeon and medical referee to the City of Edinburgh, an appointment which he continued to hold after he succeeded Sir Sydney Smith in the chair of forensic medicine in 1953.

Professor Kerr was well known in Scotland as a medical witness who was both expert and fair. His *Textbook of Forensic Medicine*, first published in 1935, was illustrated with photographs and cases from his wide medicolegal practice. Though originally written for students—he was for many years a lecturer at Surgeons' Hall—it has offered useful guidance to many practitioners, and a sixth edition was published in 1957. Professor Kerr was the representative of the Royal College of Physicians of Edinburgh on the General Medical Council.

F. S. F. writes:

"Douglas Kerr had a high sense of duty and walked very steadfastly in accordance with the principles in which he believed. He was a man of great courage. By reason of his work as medical referee he was well known by repute to a wide circle; but he was a reserved man who shunned the limelight. He had, however, great gifts of sympathy, understanding, and compassion and he had his own unobtrusive way of expressing this very real aspect of his personality."

In 1935 Professor Kerr married Phyllis McGregor, who survives him with two sons and a daughter.

MONTY TOOHEY
M.D. Dubl., M.R.C.P., D.C.H.

Dr. Toohey, consultant physician at New End Hospital, London, died on March 21 at the age of 45.

Dr. Toohey was born in Limerick and he was educated at Wesley College and Trinity College, Dublin. After graduating M.B. in 1936, he held resident hospital appointments in Dublin and at Booth Hall, Manchester, and took the D.C.H. in 1938 and the M.R.C.P. in 1939. During the late war he served with the R.A.M.C. in India, France, and the Far East, and was promoted to lieut.-colonel in charge of a medical division. After the war, he became consultant physician to New End Hospital, and thenceforward his main medical activities were centred there.

During the last four or five years, he had made a special study of long-term treatment of atherosclerosis and ischæmic heart-disease by anticoagulants, and his enthusiasm was responsible for the establishment at New End Hospital of a large, well-organised clinic. He wrote many articles for scientific and medical journals on the treatment of ischæmic heart-disease by anticoagulants and methods of control, and earlier he published a book, *Medicine for Nurses*, which has become a standard work.

J. E. P. writes:

"A little over three years ago Dr. Toohey's health began to fail and though he knew that he should have curtailed his activities both in his clinic and in research, the fact only seemed to spur him on to greater efforts. He took a great interest in the activities of his hospital and he was admired and respected by his colleagues and by his patients and staff. His loss to the hospital and to medicine is something one can hardly gauge, though the results already obtained at his clinic must ultimately prove of the greatest value in the final evaluation of the treatment of coronary disease."

Dr. Toohey is survived by his widow and two daughters.

Appointments

BANERJEE, RAHUL, M.B. Cantab., D.P.M.: senior assistant psychiatrist, Scartho Road Hospital, Grimsby.
BEAVER, M. W., M.B. Lond.: assistant M.O.H. and school M.O., Northampton.
COLLINS, G. H., M.D. Glasg., D.P.M.: consultant psychiatrist, Kingsway Hospital, Derby.
HUTCHINSON, R. IRENE, M.D. Birm., D.P.H., D.T.M.: consultant pathologist, Southampton group of hospitals.
JARVIS, H. C. M., M.B.E., M.B. Lond.: M.O. to the police and fire brigade, Brighton.
JOHNSON, THELMA D., M.B. Birm., M.C.R.A.: assistant radiotherapist, St. Thomas's Hospital, London.
JONES, P. H., M.V.O., F.R.C.S.: consultant surgeon (cardiac surgery), United Manchester Hospitals and Regional Hospital Board.
PARKINSON, EILEEN L., M.R.C.S.: assistant M.O.H. and school M.O., Northampton.
SWEETNAM, D. R., M.B. Cantab., F.R.C.S.: assistant orthopædic surgeon, Middlesex Hospital, London.

Birmingham Regional Hospital Board:

CRAMMER, J. L., M.R.C.S., D.P.M.: consultant psychiatrist, All Saints' Hospital and Uffculme Early Treatment Centre, Birmingham.
HONNEYMAN, F. D., M.D. Belf., M.R.C.P.E.: part-time consultant physician (geriatrics), Wolverhampton and Walsall groups of hospitals.
NEWCOMBE, JOHN, M.B. Lond., D.P.M.: consultant psychiatrist, Monyhull Hall Hospital, Birmingham.

Newcastle Regional Hospital Board:

BERRY, T. A., M.B., B.SC. Glasg., F.R.C.S.E.: consultant orthopædic surgeon, South Shields and Gateshead groups of hospitals.
KELHAM, B. H., M.B. Cantab., F.R.C.S.: consultant E.N.T. surgeon, Durham and North West Durham groups of hospitals.
MAURICE, D. G., M.B. Lond., F.R.C.S.: consultant plastic surgeon, regional plastic-surgery service.
NARIMAN, SAM, M.B. Bombay, M.R.C.P.E.: assistant chest physician (S.H.M.O.), Sunderland group of hospitals.
WALTON, E. W., M.D. Durh.: consultant pathologist, North Tees-side group of hospitals.

Welsh Regional Hospital Board:

CATTELL, M. L., M.B., B.SC. Wales, D.OBST.: M.O.
LEWIS, L. T., M.B., B.SC. Wales: deputy senior administrative M.O.
PHILLIPS-MILES, DAVID, M.B., B.SC. Wales: assistant senior M.O.

Notes and News

ADMISSION IN LABOUR

THE London executive council have been considering a complaint from an obstetric consultant alleging that, because a general practitioner had failed to make arrangements for a patient to be confined in hospital, the patient was admitted to the consultant's unit through the Emergency Bed Service when she was already in labour. The circumstances of the case, as ascertained by the executive council, were as follows:

The patient first went to her family doctor at the end of March, 1959, when she was 20-22 weeks pregnant, as a primigravida with home conditions unsuitable for confinement. She was sent with a letter to the antenatal clinic at Lewisham Hospital, but the hospital would not book her for a confinement with them. She did not return to the family doctor until June 15, when she brought a letter from a London County Council clinic saying that the patient had been unable to make arrangements for her confinement in hospital and that she had been instructed to consult her family doctor with a view to arrangements being made for her admission to hospital through the Emergency Bed Service when labour started or when any emergency arose. Late in July, 1959, the patient's landlady informed the family doctor that the patient would not be allowed to have her baby at home. She also implied that the patient was not attending any clinic. The doctor, therefore, asked the patient to come to his surgery, which she did on July 29. She told the doctor that she had been to the clinic and expected to be admitted to hospital when in labour as advised by the clinic. The doctor arranged to see her again a fortnight later but she went into labour on Aug. 9 and was admitted through the E.B.S. to hospital " at the request of her family doctor ".

In these circumstances the executive council found that the general practitioner had no alternative but to seek a bed for his patient through the E.B.S. at the time labour began. This was the only way at present open to a general practitioner to get a patient into hospital when an early booking had not been possible. The executive council appreciated that this procedure inconvenienced the running of the maternity units; but the blame, in their view, lay neither with the general practitioner nor with the L.C.C. clinic but with the regional hospital board, which had not reserved enough beds to allow a margin for obstetric and social emergencies.

SHORTAGE OF MIDWIVES

THE Association of Hospital Management Committees have sent a memorandum to the Ministry of Health setting out their views on this serious problem, which is likely to become even more acute during the next ten years. They agree with the Cranbrook Committee that something should be done without delay to avoid the present waste of money and nurses by training so many recruits who do not intend to adopt midwifery as a career. The inclusion of a short midwifery course in the basic nursing training, which is at present being discussed by the Central Midwives Board and the General Nursing Council, would in the Association's view be a potent remedy and would open up the possibility of a return to a single comprehensive course of training in midwifery. Employing authorities could also help by asking for a qualification in midwifery only in posts where it is really needed.

The Association would like to encourage recruits from among assistant nurses and women who are not registered nurses. Increases in salary may not be the only way of attracting and retaining staff, but the Association point out that the profession is still dissatisfied with differentials, and where promotion prospects are limited, financial compensations should be offered. Inducement payments for small and peripheral hospitals have been rejected or abandoned, but the Association suggest that schemes of this kind should be reconsidered.

NEW FILMS

Two films have lately been completed by the photographic and film unit of the Royal Society of Medicine.

The first, *They Breathe Again* (16 mm., black-and-white, sound), runs for about 25 minutes. It was made at the respiratory unit of Rush Green Hospital, Romford; and its purpose is to demonstrate—to general practitioners, hospital residents, nurses, and medical students—the principles of treatment of respiratory, bulbar, and bulborespiratory poliomyelitis. It does this, on the whole, very well, though some time is wasted on inessentials such as shots of an ambulance making its journeys, and of crowds in Trafalgar Square (to illustrate the point that many people have poliomyelitis without being ill).

In the first section, dealing with respiratory poliomyelitis, a team is shown collecting a patient from another hospital and transferring her to the unit, with support from an Oxford inflating bellows en route. The principle of a cabinet respirator is briefly explained with help from an animated diagram, and the patient is shown being expertly transferred to the cabinet respirator. The maintenance of ventilation by intermittent positive-pressure respiration (I.P.P.R.), when the cabinet has to be opened, is also shown. The importance of preventing and treating collapse of lung, by tilting and physiotherapy, is given due emphasis. For patients less severely afflicted, the cuirass respirator, the rocking-bed, and glossopharyngeal breathing are briefly shown.

The next section, dealing with bulbar poliomyelitis, is introduced by an animated diagram showing the mechanism of swallowing. This is followed by a convincing shot of the effect of forcing a drink into a patient with bulbar involvement. The use of a Ryle's tube and nursing in the prone position are shown.

In the third section, on bulborespiratory poliomyelitis, the necessity for early tracheostomy with a cuffed tube and I.P.P.R. is emphasised, and several mechanical ventilators are shown in action.

The importance of having enough trained nurses to give each of these exacting cases adequate attention is rightly indicated. Finally, the place of vaccine in reducing the incidence of respiratory poliomyelitis is discreetly mentioned.

This film fulfils its purpose well, and it gets a great deal into a short time. There are, however, some noteworthy omissions. Little guidance is given to the recognition of early bulbar involvement; nothing is said of the biochemical control of long-term cases or of the regulation of artificial respiration; and for spirometry one could have wished to see the Wright respiratory meter shown instead of the Dräger ' Volumeter ', for it is lighter and more accurate. The commentary is spoken with great clarity by Frank Phillips. Copies are available from Rush Green Hospital, Romford, Essex.

The second film is a 16 mm. ' Ektachrome ' sound film entitled *Upper Lobectomy with Sleeve Resection of the Main Bronchus*, which runs for about 25 minutes. The medical adviser was Sir Clement Price Thomas, and the audience is treated to an impressive demonstration of surgical skill.

The various stages of the operation are shown and described—rib resection, dissection of pulmonary vessels, removal of paratracheal glands, division of vagus nerve, exploratory dissection of lung tissue, division of bronchus, removal of diseased lobe, end-to-end bronchial anastomosis. But those who are not practising thoracic surgeons are liable soon to be lost in repetitive scenes of featureless lung tissue, scissors, swabs, and dissecting-forceps, and the commentator's explanation of what is being done has to be taken on trust.

This is essentially a " how-I-do-it " film, and it will probably appeal strongly only to those who have to do it. For these it should prove extremely valuable; for the photography is good, the field is little encumbered by hands or heads, and the steps are clearly described.

University of Manchester

At recent examinations for the D.P.M. the following were successful:

J. T. Elliott, N. L. Gittleson, Helen S. Mathewson.

University of Liverpool

The subdepartment of histology, which has hitherto been within the department of physiology, is to become a fully independent department in the faculty of medicine. It will continue under the direction of Dr. N. M. Hancox, reader in histology.

University of Dublin

The following have been awarded the diploma in gynæcology and obstetrics:

Bhabendra Narayan Chakraborty, Rasila Natvarlal Jariwala, Gulshan Fatima Mirza, Mehjabine Nasir Shaikh, Lalitkumar Chaturbhai Patel, Sunita Bhalchandra Patil, Basharat Rafi.

University of St. Andrews

On June 28 the degree of LL.D. is to be conferred on Prof. J. M. Webster.

University of Edinburgh

The status of honorary senior lecturer in the department of ophthalmology has been conferred on Dr. N. L. Stokoe.

Royal College of Surgeons of Edinburgh

On Friday, May 6, at 3.30 P.M., Dr. A. Rae Gilchrist will give a lecture at the college on the cardiac patient as a surgical problem.

Royal College of Obstetricians and Gynæcologists

Mr. T. N. MacGregor has been appointed Sims-Black professor. He will visit Australia and New Zealand in 1961.

The college move to their new building on April 2, and the address is now Sussex Place, Regent's Park, London, N.W.1 (AMBassador 5425).

Royal Society

The 25 newly elected fellows of this society include:

Prof. J. N. Davidson, Gardiner professor of physiological chemistry, University of Glasgow; Sir Stewart Duke-Elder, ophthalmic surgeon and director of research in the University of London at the Institute of Ophthalmology; Dr. D. G. Evans, director, Biological Standards Control Laboratory (Medical Research Council), London; Dr. P. A. Gorer, reader in experimental pathology in the University of London at Guy's Hospital Medical School; Dr. H. E. Huxley, member of the staff of the Medical Research Council department of biophysics in the University of London at University College; Dr. J. C. Kendrew, deputy director, Medical Research Council unit for molecular biology at the Cavendish Laboratory, Cambridge; Sir George Pickering, regius professor of medicine, University of Oxford; Dr. E. N. Willmer, reader in histology, University of Cambridge.

Westminster Medical School

Dr. R. I. S. Bayliss has succeeded Mr. H. E. Harding as dean of this medical school.

Order of St. John of Jerusalem

The Queen has sanctioned the following promotions in, and appointments to, this Order:

As Commander (Brother).—J. S. Grant, M.D., F.R.C.S.

As Officers.—L. E. Claremont, M.R.C.S., Pang Hok Ko, J. A. Dryden, M.B., Major-General W. D. Hughes, C.B.E., F.R.C.P.I., Q.H.P., Colonel J. C. Reed, C.B.E., M.B., A. L. Potter, M.D., M.R.C.O.G.

International Congress of Otorhinolaryngology

This congress will be held from July 23 to 29, 1961, in Paris. Further particulars may be had from Dr. Henry Guillon, 6, avenue MacMahon, Paris, 17e.

International Congress of Rheumatology

This congress will be held in Rome, from Sept. 4 to 7, 1961. Further particulars may be had from the general secretary, Prof. C. B. Ballabio, Clinica Medica Generale, Via F. Sforza 35, Milan, Italy.

Cancer Education

The Central Council for Health Education has set up an advisory committee on cancer education which will correlate activities, act as a clearing-house for information, provide a forum for discussion, and organise conferences and other activities. The committee will work from the office of the Council, Tavistock House North, London, W.C.1.

National Association for Mental Health

This association will hold a conference on psychiatry for general practitioners from May 27 to 29, in London. The speakers will be Dr. H. V. Dicks, Dr. John Fry, Dr. T. F. Main, Dr. Desmond O'Neill, Dr. William Sargant, Dr. D. Stafford-Clark, Dr. D. W. Winnicott, and Dr. Kenneth Cameron. Further particulars may be had from the education secretary of the association, 39, Queen Anne Street, W.1.

Prof. John Bruce has been appointed honorary surgeon to the Queen in Scotland in succession to Sir James Learmonth, who has resigned. Sir James has become extra surgeon to the Queen.

The Ernest and Minnie Dawson Cancer Trust is to arrange a competition for general practitioners to take the form of a thesis on cancer. Further particulars will be found in our advertisement columns.

The Oliver Bird prize for 1959 has been awarded to Miss H. M. Bruce, of the National Institute for Medical Research, London, for a series of papers on an exteroceptive block to pregnancy.

There will be a meeting for general practitioners in the outpatient department, King's College Hospital, Denmark Hill, London, S.E.5, on Sunday, April 10, at 10.30 A.M.

The Belmont Hospital Clinical Society will hold a meeting on Thursday, April 7, at 8 P.M., at the hospital, Sutton, Surrey. Dr. A. Russell Lee will speak on the intrafamilial environment of the schizophrenic.

A meeting of the subscribers of the Naval Medical Compassionate Fund will be held at 2.45 P.M. on May 13, at the Medical Department of the Navy, Queen Anne's Mansions, St. James's Park, London, S.W.1, to elect six directors.

Stammerers are to hold a symposium on the Technique of Speaking at Goldsmiths' College, New Cross, London, S.E.14, on Wednesday, April 6, at 6.30 P.M. As adult students of Mr. H. V. Hemery's classes at the college, they will read prepared speeches or speak impromptu.

For the Association of Medical Advisers in the Pharmaceutical Industry, which was formed some three years ago, a course was given on Feb. 25 and 26 by the faculty of medicine of the University of Glasgow and the Royal Faculty of Physicians and Surgeons. The subjects were corticosteroids and hypertension.

Diary of the Week

APRIL 3 to 9

Monday, 4th

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5 P.M. Mr. J. H. Hovell: Surgical Treatment of Mandibular Prognathism With Special Reference to Functional Anatomical Consideration in Diagnosis and Treatment Planning. (Hunterian lecture.)
INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
6 P.M. Prof. L. B. W. Jonkees (Amsterdam): Physiology of the Static Labyrinth.

Tuesday, 5th

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.1
5 P.M. Dr. D. Evan Bedford: Disorders of the Pulmonary Circulation. (First of two Lumleian lectures.)
ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Prof. Arnold Sorsby: Blindness in Children—Genetic Aspects.

Wednesday, 6th

ROYAL COLLEGE OF SURGEONS OF ENGLAND
5 P.M. Mr. R. A. Mogg: Renal and Ureteric Neoplasms.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5.15 P.M. *History of Medicine.* Dr. E. J. Moynahan: The Physician in Chaucer's Day.
MIDLAND MEDICAL SOCIETY
8.15 P.M. (36, Harborne Road, Edgbaston, Birmingham, 15.) Dr. P. H. Addison: Legal Pitfalls of Medical Practice.

Thursday, 7th

ROYAL COLLEGE OF PHYSICIANS OF LONDON
5 P.M. Dr. Evan Bedford: Disorders of the Pulmonary Circulation. (Second of two Lumleian lectures.)
ROYAL SOCIETY OF MEDICINE
8 P.M. *Neurology.* Dr. Maurice Partridge, Mr. T. C. Green, Dr. Harris Isbell (U.S.A.): Drug Addiction.
BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1
8 P.M. Dr. D. McC. Gregg, Dr. David Sutton, Dr. R. E. Steiner, Dr. K. E. Jefferson: Thoracic Aortography.

Friday, 8th

ROYAL SOCIETY OF MEDICINE
8.15 P.M. *Radiology.* Prof. R. S. Johnstone: Observations on Neuromuscular Disorders of the Œsophagus. (Presidential address.)
INSTITUTE OF LARYNGOLOGY AND OTOLOGY
5.30 P.M. Prof. F. C. Ormerod: Classification and Grading of Cancer of Larynx and Pharynx.
INSTITUTE OF NEUROLOGY, National Hospital, Queen Square, W.C.1
4.30 P.M. Dr. P. W. Nathan: Nerve Fibres Subserving Cutaneous Sensation.
BRITISH TUBERCULOSIS ASSOCIATION
11 A.M. (University of Southampton.) Opening of two-day meeting.
WEST LONDON MEDICO-CHIRURGICAL SOCIETY
8.30 P.M. (Royal Society of Arts, John Adam Street, W.C.2.) Sir David Campbell: Observations on the History of the Treatment of Disease. (Cavendish lecture.)